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THE OPHTHALMIC RECORD

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T. A. WOODRUFF, M. D.
EDITORIAL SECRETARY,
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COLLABORATORS.

Francis Valk, M.D., New York.

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J. W. Stirling, M.D., Montreal, Can.

Frank Allport, M.D., Chicago.

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The January number of the Ophthalmic Record will contain, amongst others, an original article by Percy Fridenberg, M.D.,—"Detection of Simulated Monocular Blindness;" one by George E. de Schweinitz, M.D.,—"A Note on Toxic Chromatopsia and Toxic Hysteria;" one by S. B. Muncaster, M.D.,—"Hernia of Sclerotic." There will also appear reviews of the most recent contributions to Ophthalmology, editorials by prominent ophthalmologists, society reports and miscellaneous items of interest.

The Record particularly desires short practical papers on any subject connected with Ophthalmology. These will be published at as early a date as possible. It is understood that, unless otherwise arranged, original articles when accepted are contributed to the Record exclusively. Illustrative cuts will be made at the expense of the journal and proofs for correction will be sent to authors when desired. Reprints with covers are furnished at cost. One hundred of these will be presented to authors *gratis* when a request for them is written on the original manuscript. The Record will be issued monthly and each number will contain about 54 pages of reading matter.

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T. A. WOODRUFF, M.D., Editorial Secretary,
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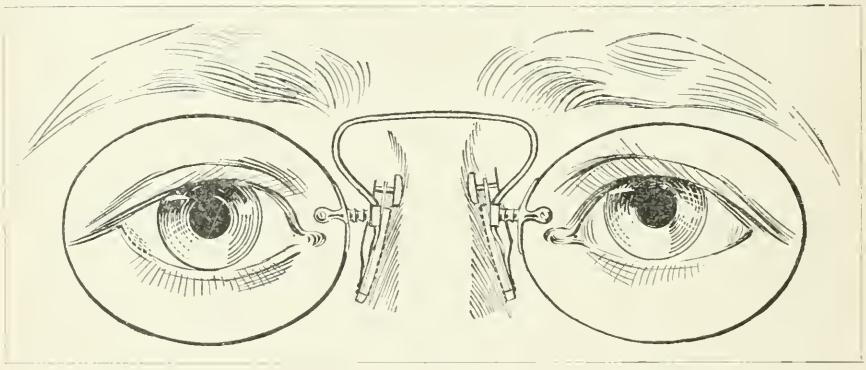

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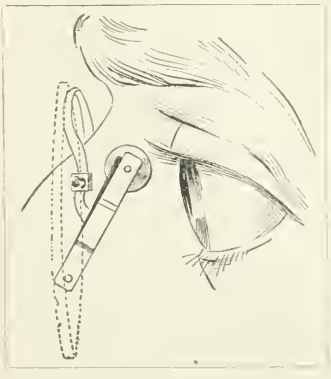

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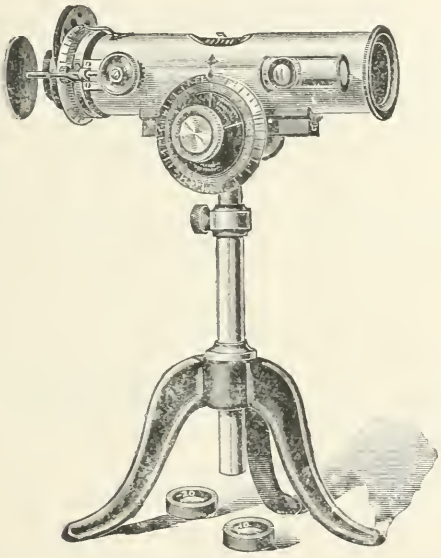

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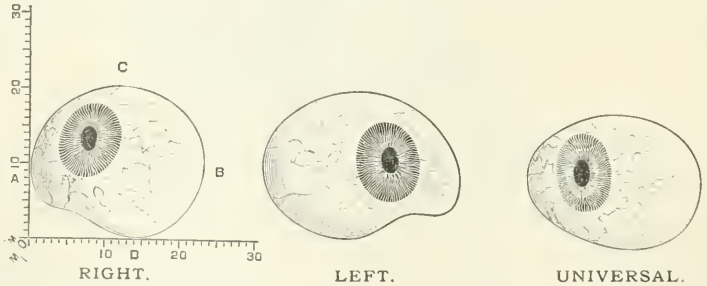

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THE

OPHTHALMIC RECORD

A MONTHLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

VOLUME VII. CHICAGO, DECEMBER, 1898. No. 12. NEW SERIES

ORIGINAL ARTICLES.

THE DISTANCE BETWEEN SURGEON AND PATIENT FOR ACCURATE SKIASCOPY.

BY EDWARD JACKSON, A.M., M.D.

DENVER, COL.

Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic.

ILLUSTRATED.

To see a thing you must get within seeing distance of it. A certain area cannot be perceived beyond a certain distance. The half-metre test-types are very useful at the distance of a half metre or less, but they are of very little use at one metre, and quite worthless at two, four or six metres. In skiascopy there are movements of light and shadow in the pupil that can be seen at one-half metre, which are not to be seen at one metre or any greater distance ; and in many eyes it is these movements, and these alone, that truly indicate the "refraction of the eye."

When we speak of the "refraction" of an eye we mean the refraction of that part of the dioptric surfaces through which the best vision is obtained. The trial lenses in the subjective test deal usually with this refraction alone, completely ignoring the refraction of all other parts of the pupil. It is true Donders said something about "normal irregular astigmatism" present in all eyes ; but in practice the ophthalmoscope, the test-lenses, the radiating lines, the stenopaic slit, the various optometers never remind us of this "normal irregular astigmatism," this departure from the "refraction of the eye" which occurs in the periphery of every dilated pupil. Hence in works on ophthalmology, and in papers

about errors of refraction and their measurement and correction, it is usually quite forgotten.

But if one wishes to practice skiascopy with skill and exactness he must not forget this refractive condition for an instant, during the application of the test to any eye. Until this is thoroughly understood the possible accuracy and the reliability of skiascopy cannot be attained or even appreciated.

The essential fact is, that in every dilated pupil there is a restricted area, in which the refraction is comparatively regular, and the same in all portions, whether it be hyperopic, myopic or astigmatic. It is the correcting lens for this area that the patient usually selects by subjective tests. It is for the correction of this area that we prescribe correcting lenses. It is the light entering through this area, and usually this light alone, that can be perfectly focussed on the retina, either with correcting lenses or without them. This area I have called the *visual zone*[1].

This area never occupies the whole of the dilated pupil. Around it there lies another area in which the refraction is not regular, is not the same in different portions ; an area the refraction of which is commonly entirely ignored by the patient in his selection of lenses by subjective tests, and equally ignored by the surgeon in prescribing lenses ; and usually no lens, or combination of lenses, can accurately focus on the retina the light entering through this area, or cause it to give distinct images. This latter area I have called the *extra-visual zone.*

In most eyes the visual zone contains less than half the area of the dilated pupil; the extra-visual zone contains more than half. In some the visual zone contains only one-tenth the area of the pupil, the extra-visual zone nine-tenths.* Usually the visual zone occupies the center of the dilated pupil ; and the whole of the pupil when it is contracted by strong light out of doors, or by associated impulses, with the convergence and accommodation usually necessary for near work. But in the majority of eyes, without the use of any mydriatic, the pupil dilates sufficiently, in a room darkened for skiascopy, to include a considerable portion of the extra-visual zone ; and in some eyes a portion of this zone is exposed even under the ordinary conditions of normal use of the eyes in a good light.

In skiascopy, therefore, one has to consider the appearances presented in a visual zone of the pupil having a certain state of refraction ; and the appearances presented in an extra-visual zone having a different state, or

*It is to be remembered that the area is proportioned to the square of the diameter. Thus in a pupil 8 mm. in diameter, if the visual zone were 5 mm. in diameter, their areas would be as 64 to 25. If the visual zone were but 2.5 mm. in diameter the proportion would be as 64 to 6.25.

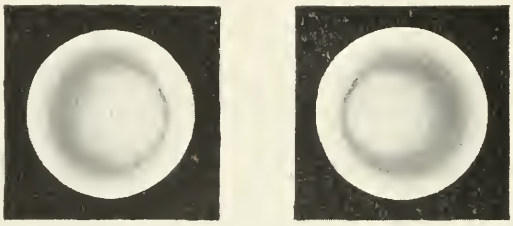

FIG 1

FIG 2

FIG3

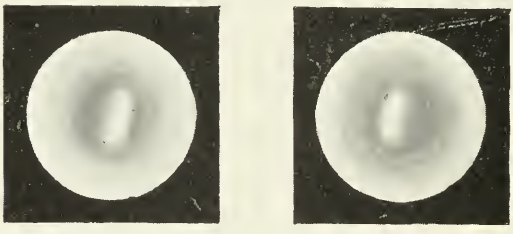

FIG. 4

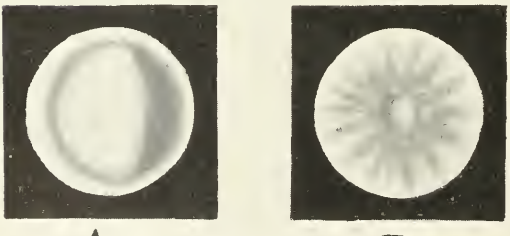

FIG. 5

different states of refraction. Obviously, exact and reliable measurements of the refraction by skiascopy are only possible when the surgeon is near enough to the examined eye to discriminate between these zones; and to recognize with certainty the movements of light and shadow within the visual zone.

While no one may be disposed to question the theoretic correctness of this view, the adaptation of distance to the requirements of the case has been so generally ignored that it is certain that few understand its practical importance. To illustrate and enforce that importance a few common instances may be considered.

The commonest optical condition of the extra-visual zone is that of positive aberration. (See chapter V of the writer's monograph[2], and original description[3]). The visual zone is not usually much over 5 mm. in diameter; and a case of aberration having such a visual zone is represented in Fig. 1, which gives the appearances presented at a point about 0.5 dioptre closer to the patient than the point of reversal, with mirror facing in A rather to the surgeon's right, in B to the left. The pupil is here represented as magnified three diameters. In Fig. 2 the same appearances are represented, but only of life size. In Fig 3 we have the same thing reduced to one-fourth the dimensions of Fig. 2.

If this page be placed one metre from the eye Fig. 2 will represent the appearances presented in skiascopy as practiced at a distance of one metre from the patient. In contrast with these Fig 1 shows the relative size and appearance of the pupils from a distance of one-third of a metre; while Fig. 3 gives about what is visible when the surgeon places himself four metres from the patient. In such a case it is quite possible to recognize the movements of light and shadow in the visual zone at one metre, although it would be somewhat easier at a shorter distance. But at four metres there must be great uncertainty about them. And the great trouble at four meters is, not that no movement of light and shadow can be perceived—if that were the case no one would think of working at such a distance; but that it is utterly impossible to tell whether the movements perceived are in the visual or the extra-visual zone. Indeed in most eyes it is the movement in the extra-visual zone that can be perceived at the greater distance; and thus applied skiascopy becomes only an approximate test, accurate only to the extent that the refraction of the extra-visual corresponds to that of the visual zone.

In Fig. 4 are presented the characteristic band-like appearances of astigmatism in an eye getting 4/3 vision with +1.50 cyl. axis 80°; this being the correction for its visual zone, which included an area between 3 and 4

mm. in diameter at the center of the pupil. They are shown with the mirror facing in A to the surgeon's right, in B to his left. At one metre it would have been easy to overlook the characteristic form and direction of the little area of light that flitted back and forth in a small space at the center of the pupil. And had the astigmatism of this visual zone been lower in amount, 0.50 or 0.75 D., as it is in the majority of cases that require correction, it would have been quite impossible to detect any sign of it at one metre distance, although it could be certainly recognized at one-half metre. In a considerable portion of cases the characteristic appearances of astigmatism are strictly confined within a small visual zone.

Again, as one approaches the point of reversal the area of uniform movement of light and shadow, the area of the apparent visual zone diminishes; and just at the point of reversal it breaks up into smaller areas differing slightly from each other in refraction. Often the true visual zone is only one of these smaller areas, the existence of which will remain quite unsuspected if one works always at one metre. A case of this kind is illustrated in Fig. 5, in which A represents the appearance of the pupil from about 1D, within the point of reversal, the mirror facing rather to the surgeon's left; and E represents the appearance at the point of reversal for the vertical meridian, showing the true visual zone with a faint area of light indicating the presence of 0.50D. of astigmatism with the rule, confined to such a small area that it could not possibly have been detected by skiascopy at one metre. At the same time the segmental inequalities in the refraction of the lens become evident in the periphery of the pupil.

To appreciate the importance of testing such an eye by skiascopy at one-half metre, it must be noted that astigmatism confined to such a small area is very likely to be overlooked with the test-lenses used upon test-type at twenty feet, in the ordinary light of a surgeon's office, even without a mydriatic. But that small area will constitute the whole pupil, when the eye is exposed to strong daylight, or the patient is taxing his accommodation for near work; and the correction of its astigmatism will be practically as important as the correction of the same degree of astigmatism affecting the whole dilated pupil.

In view of the practical reasons for skiascopy at shorter distances it seems strange that almost every account of skiascopy in our text-books mentions one metre or more as a proper distance between surgeon, some even advise four metres or more for the plane mirror; and the writer has been alone in urging the use of the test from a distance of

"one-half or one-third of a metre, or even less."[4] It is, however, certain that for many eyes accurate measurements of the refraction cannot be made at greater distances. This point is of vital importance to skiascopy. Failure to recognize fundamental conditions of general accuracy for the test has raised a doubt as to its accuracy and reliability even in the minds of some of its advocates.

It is not claimed that all examinations must be made at so short a distance. Only that some must be made at this distance, while others can be made here or at greater distances. In practice the writer finds himself now commonly applying the test at distances of eighteen to thirty inches, corresponding to myopia (usually artificial) of from 2.25 to 1.25D. This practice was adopted, not in obedience to theoretical considerations, but rather in spite of them; since it rendered necessary their amendment by recognition of the refractive conditions underlying the separation of the pupil into visual and extra-visual zones. As a matter of fact it is found that attention to certain details, as the form size[5] and position of the source of light,[6] and the size of the sight-hole in the mirror[7] make it possible to attain the greatest practical accuracy (0.25D. to 0.125D.) even at these short distances mentioned.

With skiascopy one has in the pupil a map of various refractive conditions situated in different areas. The nearer the pupil the larger the scale of this map, and the easier to note its smaller details. Then it is not a map in black and white, but of brighter red upon duller red ; and as the point of reversal is approached the contrasts diminish, the areas shade imperceptibly into one another, so the need to have it on a larger scale increases.

Matters closely related to the subject of this paper have been discussed elsewhere as indicated in the following:

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THE UTILITY OF THE OPHTHALMOMETER,

BY DR. GEORGE J. BULL,

OF PARIS, FRANCE.

In discussing the utility of the ophthalmometer it is worth while to remember the way in which the instrument came into existence. Helmholtz had already succeeded, many years ago, in devising an instrument with which Knapp and Donders were able to measure corneal curvature in the laboratory; but the method was altogether too difficult and complex to be applicable to the uses of the consulting room. It occurred therefore to Dr. Javal about the year 1879 to endeavor to obtain an adaptation of the instrument of Helmholtz by means of which astigmic error could be conveniently determined for the purpose of prescribing corrective glasses. By the aid of the mechanical and mathematical skill of Dr. Schiötz of Christiana, Dr. Javal was able to solve the problem, and the ophthalmometer which bears their joint names was the result.

Javal applied this in his practice at first with the assumption that he could prescribe off-hand the glasses indicated by the reading. At this point I joined him. We soon found that glasses so prescribed were not the proper correction of the real astigmia, and I have ever since been engaged in the effort to work out the problem so presented, and to establish the true principles of the exact correction of refractive error. The result is to convince me that although the ophthalmometer cannot, in the least, be used as was at first intended, it is nevertheless a most valuable guide and check in the search for the correcting glass.

The conditions of the problem of the correction of refractive error may be broadly stated as follows: Astigmia of the whole eye — total astigmia, as it is called — is the resultant of the special astigmia of four refracting surfaces; or, in other words, is the resultant of the corneal astigmia which is measured by the ophthalmometer and intraocular astigmia, under which term I include the error due to the posterior surface of the cornea, and the anterior and posterior surfaces of the crystalline lens.

To determine the amount of intraocular astigmia, we have recourse to such instruments as Tscherning's ophthalmophacometer. Tscherning has examined a certain number of eyes and has found in all of them that

the crystalline and the posterior surface of the cornea produce together an inverse astigmia.

My own experience leads me to believe that this is the general rule; for the comparison of the amount of the corneal astigmia with that of the total astigmia in a large number of cases shows that the difference may be roughly expressed as being equal to an inverse astigmia of about 0.75 D. I find also, that the meridian of greatest refraction of the whole eye does not always coincide with the meridian of greatest corneal curvature; and that if the corneal astigmia be of low degree, the meridian of greatest refraction of the eye will incline more toward the horizontal than does the most curved meridian of the cornea. I find also that when the corneal astigmia is high the meridian of greatest refraction of the eye commonly coincides with the meridian of greatest corneal curvature; all of which facts are indications of the correctness of the hypothesis just stated.

Although one element out of the four can be measured with quickness and accuracy by the ophthalmometer of Javal and Schiötz, and although there are laboratory methods by which the other three factors can theoretically be determined by objective measurement, there is no method available in ordinary practice by which an observer can determine the total astigmia merely by taking the readings of one or more instruments.

As this conviction has impressed itself upon practicing oculists it is perhaps natural that many of them have been inclined to put the ophthalmometer aside, as an instrument which had failed of its purpose. Some have even supposed that the rival ophthalmometer of Kagenaar or that of Hardy, might be looked to for better results. Both ideas are entirely erroneous. The ophthalmometer of Kagenaar (and that of Hardy), although an instrument of considerable merit, has no real advantage as compared with the instrument of Javal, and it has the disadvantage that the amount of doubling produced by its biprism varies with the distance of the patient.

The supposition that the ophthalmometer itself is to be regarded as a failure because its readings cannot, for the reasons above stated, express the total astigmia is very short sighted. Apart altogether from those cases in which an ophthalmometer is absolutely indispensable for the purpose of studying the changes of corneal curvature which occur after wounds of the eye, and during the progress of keratoconus, pterygium, etc., and its obvious value in the diagnosis of irregular astigmia, it is es-

tablished that the practical value of the instrument in ordinary cases of regular astigmia is even greater than many of its admirers realize.

It is a great advantage to know beforehand the amount of astigmia that we may expect to find. By the use of certain rules presently to be stated, we can safely infer in many cases from the ophthalmometric measurement that the total astigmia does not exceed 0.25 or 0.50 D. Such an inference is often of value, and saves us from a wearisome and fruitless search with cylindrical glasses. When, on the other hand, the ophthalmometer shows that we have to deal with a high degree of astigmia, we properly dispense with trials with the beaker cylinders, and in this way gain time, spare the patient fatigue, and greatly simplify the problem which his answers help us to solve. Much might be said on the value of the instrument as a time-saver; but I prefer to call attention to an advantage which has not, to my knowledge, been referred to by other writers.

This advantage is that the ophthalmometer enables us to proceed in the different parts of the subjective examination with logical precision and certainty, not so much by indicating the amount of astigmia as by pointing out the position of the meridian of least refraction.

The method I recommend* for the subjective examination of astigmia consists of two steps: first, by means of spherical glasses I shift the patient's range of accommodation, so as to bring the *remotum* of the meridian of *least* refraction to the test cards at 5 metres; and, secondly, by concave cylindrical lenses I carry back the *remotum* of the meridian of *greatest* refraction till it also rests on the test-cards. The first of these steps fixes one end of the object to be measured, and prevents its moving in a way to mislead me; for if at any subsequent moment during my trials the eye accommodates, the lines which remained distinct on the clock-dial will appear less distinct, and all the other lines will be blurred in proportion; and, in fact, as if aware of this the eye makes no efforts of accommodation. The lines remain unequal in distinctness until we add the cylindrical glass which corrects the astigmia.

In myopic astigmia it is the common practice of observers to proceed on a plan closely resembling the one I have just outlined. Instead, however, of following such a plan in cases combined with hypermetropia, they take no special pains to distinguish between the two principal meridians, and not knowing with which they have to do, fail to prevent changes in accommodation which alter the relative value of the radiating

*Bulletin de la Soc. Francaise d'Ophtalmologie, 1895, p. 399: Ophthalmic Review, 1895, p. 275: Archives d'Ophtalmologie, 1896, p. 219.

lines of the clock-dial. The practical result of this, and of trying new convex and new concave cylinders, is simply to introduce artificial difficulties into the solution of the problem. By my method, however, the process is exactly the same for hypermetropic and mixed astigmia as for myopic astigmia, and mydriatics are not required.

This method can, like all other subjective methods, be carried out without the aid of the ophthalmometer; but that instrument can often be made to render a special service in this connection. I shall presently give a series of empirical rules, by which it will be seen that there are inferences to be drawn from the ophthalmometric reading before the patient has been examined in any other way; but other and more important inferences can be made when the ophthalmometric reading is considered in connection with the answers given by the patient during the subjective examination.

The instrument, as I have said, informs us of the position of the meridian of least refraction of the eye, and thereby often enables us to interpret the answers of the patient in a highly practical way. If, for example, the instrument shows a direct corneal astigmia of 4 D. (0 ± 4.) we may infer with certainty that the horizontal meridian of the eye in this case is the meridian of least refraction. If, now, the eye, looking without a glass at the clock-dial, six metres distant, perceives that the *horizontal* lines (and not the vertical) seem the most distinct, we *recognize at once that the eye is strongly hypermetropic*, and by rapid steps, passing over the weaker lenses as useless, we find the strongest convex lens with which the vertical line of the clock can be seen distinctly, and then add the weakest concave cylinder that will render the transverse lines equally distinct.

It may be said without exaggeration that the use of the ophthalmometer in connection with any special method of subjective examination makes hyperopic, and mixed astigmia often easier of correction than simple myopic astigmia.

As a result of my examination of the problems presented by this instrument, during the twelve years since I first joined Dr. Javal in his efforts to apply it in practical work, I am able to say that there are a few simple rules by the application of which the measurements of the ophthalmometer may be made to furnish a most useful guide. Speaking broadly, it may be said that the total astigmia is approximately equal to the amount indicated by the ophthalmometer, expressed as myopic astigmia, combined with an inverse myopic astigmia of 0.75 D. It may be said that :—

(1) When the corneal astigmia is direct, and above 1 D., we may expect the total astigmia to be also direct, but of lesser amount.

(2) When the corneal astigmia is direct, and about 0.75 D., we may expect to find an almost total absence of astigmia by subjective examination.

(3) When the corneal astigmia is direct and 0.25 D., subjective examination will probably reveal an inverse astigmia of about 0.50 D.

(4) When there is no corneal astigmia we may expect to find by subjective examination an inverse astigmia of about 0.75 D.

(5) When the corneal astigmia is inverse, we shall generally find by subjective examination a higher amount of inverse astigmia.

(6) When the corneal astigmia is oblique, and direct rather than inverse, a lower degree of astigmia will be discovered by subjective examination. The reverse of this is true when the obliquity tends to bring the case into the class of inverse astigmia.

(7) When the corneal astigmia is oblique and of low degree, the meridian of greatest refraction of the whole eye commonly inclines more toward the horizontal than does the meridian of greatest corneal curvature.

(8) When the corneal astigmia is of high degree the meridian of greatest corneal curvature coincides with the meridian of greatest refraction of the eye.

The above deductions are, of course given only as approximations to the truth. The ophthalmometer should never be considered as a substitute for the subjective method of examination. It should be looked upon as a guide and as a check, enabling us to conduct the subjective examination on logical principles.

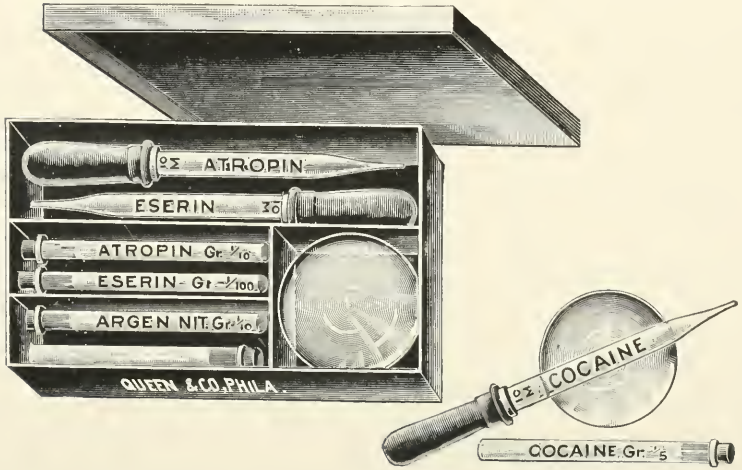
A CASE FOR THE EXTEMPORANEOUS FORMATION OF THE SOLUTIONS USED IN EYE SURGERY.

WILLIAM E. BAXTER, M.D.

BOSTON.

Illustrated.

There is no question as to the desirability of having the solutions of drugs used in eye surgery aseptic, though there is some difference in the methods used by various surgeons in reaching this end. Some use in their interocular operations the solutions in daily use in their practice, sometimes, perhaps, made up in a saturated solution of boric acid. Others use special solutions reserved for interocular operating. Others carry special


ATROPIN
ESERIN
ATROPIN Gr. 1/10
ESERIN Gr. 1/100
ARGEN NIT. Gr. 1/10
QUEEN & CO. PHILA.
COCAINE
COCAINE Gr. 1/5

flasks in which the solutions can be sterilized by boiling before each operation, and this might be satisfactory were it not for the fact that some of the drugs in ordinary use are injured by boiling. Others use fresh solutions made for each operation, which is perhaps the best if the druggist can be relied on to use sterilized water and receptacles. The writer has had a case made up, by means of which various solutions can be extemporaneously prepared, and for perfect asepsis and convenience leaves little to be desired. This outfit consists of a nickel box 4 by 2½ by ⅝ inches, partitioned as seen in the illustration, containing three dropper pipettos of exactly ten minims capacity, and having the words atropin, cocain and eserin engraved upon them; three watch glasses of a size to hold about twenty minims; and tubes containing tablets or discoids, in a soluble state, of the pure drugs of cocain hydrochlorate gr. $\frac{1}{5}$, atropin sulphate gr. $\frac{1}{10}$, and eserin sulphate gr. $\frac{1}{100}$. These discoids are of the exact weight to make with ten minims of water, solutions of cocain 2. per cent atropin 1. per cent and eserin .1 per cent; by increasing either the number of discoids, or the amount of water, solutions of different strengths can be made. In using this case all that is required to form an aseptic solution is to place the droppers and the watch glasses in boiling water, to render them sterile, place ten minims of the boiled water in one of the glasses with the dropper, drop in a discoid, and one has ready for use a small quantity of a fresh solution. This case has been made for me by Queen & Co., Philadelphia, from whom the case and discoids may be obtained. The discoids are made by Schieffelin & Co., New York.

553 Boylston Street.

THE SURGICAL TREATMENT OF AMETROPIA.

BY ROBERT SATTLER, M.D.

CINCINNATI, O,

Surgery, undertaken with a definite purpose for the betterment of sight and the permanent reduction of an ametropic state dependent upon abnormal congenital or acquired axial dimensions, or a malformation of the dioptric media, is a modern achievement.

Formerly surgical intervention was confined to certain congenital deformities* and to the excessive degrees of ametropia which accompanied them.

*The time required, as well as the risks which had to be incurred in these uncommon cases, were greatly out of proportion compared with the slight benefit which even the most successful surgical treatment could secure, and for these reasons it found little or no favor. It was more encouraging in those cases of acquired ametropia dependent upon ectasia of the cornea and other attendant morbid changes, the result of local and constitutional causes, with their high myopic and astigmatic refraction.

It was only occasionally practiced, and almost without exception with indifferent success in congenital staphyloma-pellucida or keratoconus and dislocations of the lenses. In cases of congenital partial opacity of the lenses, cataracta zonularis, pyramidalis, etc., it was practiced with more satisfactory results.

Before other questions, which bear prominently upon the subject, are taken up, it is necessary, at the outset, to re-affirm a well known statement that the modern surgical methods for the relief of ametropia in general are concerned with and can only accomplish a reduction in the power of the dioptric apparatus.

For this reason it is evident that the application of surgery is limited, and that it can only be resorted to for the amelioration of the myopic expression of ametropia. But even with this class of cases, it is justifiable only, in the higher or excessive degrees of axial and dioptric myopia, and of incorrigible corneal or lenticular astigmatism. To the latter must be added the more infrequent congenital malformations, with their excessive refraction and hopelessly reduced and hampered sight,—lenticonus,—altered index of refraction of all, or of one or several sectors of the lens with preservation of transparency,—of thinning and ectasia of the extreme periphery of the cornea or of its central region.

In such cases surgical interference is justifiable, only, if repeated and painstaking tests have disclosed that no combination of lenses affords useful aid. If the patient, in consequence of his blindness, is rendered helpless, it may become an imperative, necessary, venture.

The special purpose of surgery, in cases of high myopic deformity, in which it is both a justifiable and necessary measure, is wholly concerned in bringing about a reduction of the existing excessive refraction.

It is to Fukula that the distinction belongs of having first suggested the removal of the lens with the definite aim of reducing by 10. to 12. D. a higher or excessive degree of myopia, or, in exceptional instances, in which the myopia happened to correspond to the refractive power of the lens, 9. to 11. D., to completely or exactly neutralize the existing ametropia.

If surgical intervention was successfully accomplished, the necessity of wearing strong concave glasses no longer existed, in certain cases; in others much weaker lenses could be used after the operation therefore doing away with the objections which the constant use of strong concave glasses entails.

If the special indications for surgical intervention in the relief of uncommon ametropic states of the eye are considered, it will be found to

accomplish a useful purpose in different expressions of excessive myopic refraction.

The foremost indication is to reduce, or neutralize, certain high or excessive degrees of congenital (axial) myopia (higher than 11 D.) in which marked or active structural disease of the internal structures can be excluded, in youthful and otherwise healthy subjects.

If, in addition, it can be established that the congenital deformity, especially at the posterior pole, is not too marked, and if it can, furthermore, be assumed with reasonable certainty that the amblyopia (or the impossibility to obtain, at best, more than 0.1 or 0.2 vision, even with the strongest lenses) is not due to an anamoly of the perceptive structures, but to excessive refraction or incorrigible astigmatism of the lens, a more favorable indication, even, for surgical treatment is at hand.

In such cases it is not alone justifiable, but it holds out a prospect for the betterment of vision, which lenses can never afford without it.

The most brilliant achievements of surgery are observed in those, unfortunately, very rare cases in which the removal of the lens neutralizes exactly the excessive degree of ametropia present and restores useful vision without the aid of corrective lenses. It is also indicated, during adolescence, in the higher degrees of acquired myopia, in which an arrest of progression appears evident. The lenses which are necessary to secure whatever vision may be present, are thick, heavy and cumbersome. To rid the patient of this annoyance, and to secure better vision, for even in these cases (dioptric myopia) altered refraction on the part of the lens cannot be excluded, the operative treatment is a measure of rational expediency. It is contra-indicated in all excessive degrees of congenital or acquired myopia, in which a tendency to inexorable progression must be admitted, together with unmistakable evidences of structural disease of the uveal tunic, vitreous humor and retina. It is inexpedient to practice this method in older subjects with evidences of synchisis of the vitreous humor with imminent detachment of the retina.

Removal of the lens may be effected by one of two methods, which the choice of the surgeon must determine. The operation, in young subjects, should invariably be preceded by a carefully guarded traumatism, which brings about cataract. This is subsequently removed by discission or extraction, as the judgment of the surgeon may decide. In adults who have passed their thirtieth year, extraction is the method, and this can be done either without inflicting a previous traumatism, which renders the lens opaque, or the lens is removed in its normal or transparent state.

Risks attend both procedures, but with the latter they are greater than with the former. If a cataract is artificially produced, increase of tension and other complications, due to swelling of the lens, can be more effectually combatted. If the lens is removed in its transparent or normal condition, capsular adhesions may prove troublesome, and cyclitis, glaucoma and other complications may be excited.

It is also indicated in excessive dioptric myopia (congenital malformation with preservation of the transparency of the lens). For these uncommon expressions of congenital ametropia, the application of surgery will, I am confident, secure in this country also the same brilliant triumphs which have been achieved abroad. I have long been of the opinion that we often assign the impossibility to obtain a better acuity of vision in these unfortunate cases, to fictitious amblyopia of perception. It is far more probable, in certain cases at least, that, together with a moderate axial myopia, the real cause for feeble or diminished sight which cannot be improved by optical aid, is dependent upon a congenital alteration of the index of refraction of the lens, with the additional, and still more uncommon variation, in some instances, of greater or less refractive power in its different parts or sectors. Necessarily, this results in distorted refraction and its inevitable consequences. Such cases bear an inseparable resemblance to, and are classed with, the high and incorrigible myopic deformities. Ineffectual attempts to secure better aid from glasses finally convince both physician and patient of the uselessness of the effort.

Surgery is furthermore indicated in these cases of myopic refraction, due to conical cornea and allied lesions of this important part of the dioptric apparatus, in which most painstaking search proves the impossibility of securing better vision by the aid of even the strongest combination of lenses.

In a recent communication* on the surgical treatment of ametropic states, dependent upon conical cornea, the results of a limited personal experience are summarized, and, as the indications are there stated, no further reference is here necessary. Personally convinced of the advantage of surgical intervention in certain cases of high ametropic defects, I can only add the hope that in this country we may, in time, aid the zealous workers abroad in this department of ophthalmic surgery. Our opportunities are more limited. The cases so common abroad are less so with us. For this reason it will require time before a final or decisive concensus of opinion can be given, based on larger experience and investigation.

*Read before the meeting of the American Ophthalmological Society, July, 1898.

ANISOMETROPIA.

BY S. D. RISLEY, M.D.,

PHILADELPHIA, PA.

Professor of Diseases of the Eye, Philadelphia Polyclinic and College for Graduates in Medicine; Attending Surgeon, Wills Eye Hospital.

There is probably no class of congenital abnormality of vision which proves more annoying to the patient or more puzzling to the ophthalmic surgeon than anisometropia. Starting with the proposition that for ideally perfect vision we must have a pair of emmetropic eyes with a physiological range of accommodation and convergence, it is obvious that this ideal condition must suffer impairment from any considerable variation in either of the conditions. Observation and experiment have shown, however, that within certain limits, which probably vary in different individuals, an acquired adaptation to the faulty conditions between accommodation and convergence may be secured by experience, and relatively comfortable binocular vision enjoyed. When, however, a great difference exists in the degree of the anomaly of refraction present in each eye the difficulty of adaptation is much greater, if not impossible. The probability of greater difficulty is rendered manifest by a few simple considerations. For example: Any wide difference in refraction suggests at once a corresponding difference in the form of the eye balls, a very high hypermetropia being due to a shallow ball, or it may be to one abnormally small in all its diameters as compared to its fellow, which may be approximately emmetropic, or even myopic and abnormally large in all its diameters. These conditions introduce a number of disturbing factors. In the first place the abnormally small ball will be moved in all directions with relatively greater ease than its fellow, whether emmetropic or myopic. Then too, the images projected upon the macula by its dioptric system when carefully and accurately focused upon the retina will be smaller than those received by the fellow eye. It is of more clinical importance, however, that the same image cannot be focused simultaneously on the macula of both eyes. In the hypermetropic eye, e. g., a considerable tension of the ciliary muscle, it may be that the total range of accommodation will be required even for distant objects to

secure an accurately focused image on the retina; while the fellow eye, whether emmetropic or myopic would receive only a blurred image at the macula. Indeed, the blurring of the image would be increased in either case by the effort of the hypermetropic eye to see distinctly, for the reason that the accommodation impulse cannot be exercised by the eyes separately. Therefore, with an accurately focused image in the hypermetropic eye, the focus of the dioptric system of its fellow whether emmetropic or myopic, must be in front of the retina. On the other hand, if a clear image is enjoyed by the emmetropic or myopic eye, the focal point must lie far behind the retina in the hypermetropic eye. Satisfactory binocular vision is therefore impossible.

The clinical management of this condition is the problem which daily meets the surgeon for solution. Fortunately, in a considerable number of these patients their experience solves the problem by abandoning any attempt at binocular vision, in which case, the more defective eye is allowed to wander out, the divergence permitting the obscured or imperfectly focused image to fall upon a less sensitive portion of the retina than the macula, where its recognition by the visual centers can be more readily neglected. In a much larger group of patients, however, a converging strabismus is acquired, the defective or less useful eye being abandoned to strong convergence and no effort made to secure binocular vision. Unfortunately for the comfort of many individuals afflicted with anisometropia they do not for some reason secure freedom from asthenopia in this manner and therefore seek relief at the hands of the surgeon, not from a strabismus, but from pain and imperfect vision.

In cases of myopia on one side, and hypermetropia on the other, it is quite common to find no effort at binocular vision, but nevertheless, for the most part, parallel visual axes. In such cases the hypermetropic eye is used for distant vision, and the myopic eye for near work; the former possibly slightly diverging during the act of near sight. The writer recalls two instances, both clergymen, who had enjoyed comfortable use of their eyes under these conditions until advancing presbyopia disturbed the possibility of clear vision either for distance or near. At fifty years of age it was no longer possible to correct by any possible effort of the accommodation the hypermetropia for distance, while the myopia in the other eye was not sufficient to correct the presbyopia. There was present in both cases low grades of astigmatism in each eye. It was needful, therefore, to seek relief from their steadily increasing asthenopia and imperfect vision.

Before turning to the methods to be adopted for the relief of anisometropia the etiology and nature of these conditions need some consideration. As regards antemetropia,* it may, from the standpoint of etiology be considered with anisometropia, i. e., emmetropia, or a relatively low grade of hypermetropia or myopia on one side and high grades on the other. In the writer's experience, with rare exceptions, in antemetropia the myopia has been acquired, and in cases where the struggle for binocular vision still persisted was still progressive and associated with the advancing characteristic pathological conditions of progressive nearsight. In every case coming under the writer's observation one or both eyes have been also astigmatic, the astigmatism being present in higher degree usually, on one side than on the other.

Another noteworthy fact is that the principal meridians of the astigmatic cornea are asymetrical. That is to say, if at 90° and 180° in the better eye, they will be found inclined in the more defective one. The fact that these defects in the form of the ball are congenital, led me very early in their study to seek for their cause. Very many photographs taken at different ages between infancy and adult life of individuals belonging to this group have been secured, and careful observation made of the relative size and shape of the two sides of the face. Hatter's forms have been studied and the peculiarities in the shape of the skull noted. It very soon became obvious that not only were the ocular defects congenital, but that they were associated with abnormalities of form in the skull which gave rise to variations in the size and form of the orbits. The eye balls, developed within these abnormal bony environments, were subject to corresponding degrees of distortion resulting in varying grades of hypermetropia and astigmatism. In many cases of high grades of refraction defect in one eye, usually with high astigmatism and asymetrical meridians, the face on the corresponding side will be found smaller than on the other, the zygomatic arch less prominent, and the lines of the skull quite different from those on the opposite side, as shown by the hatter's forms or by cursory observation. If a horizontal line be drawn through the pupil of one eye, it will frequently be found to lie above or below the pupil of its fellow if the head is held erect. There is often observed also a marked lateral displacement, the pupil of one eye being much nearer the median line of the face, as represented by the bridge of the nose. It is in these cases of congenital abnormality that are found the most annoying examples of absolute insufficiency of one or more of

* Noyes, 5th International Congress, 1877.

the extra-ocular muscles which adds greatly to the complexity of the problem of relief. It is to be expected that, when an eye ball is deformed through development in an abnormally shaped orbit, we should find also derangement of the binocular balance through faults in the length and direction, the origin and attachment to the globe, of the complex motor system of the eyes. Clinical experience demonstrates the truth of this *a priori* reasoning in many of these patients. These considerations should be sufficient to deter the thoughtful surgeon from all dogmatism in the study and treatment of these unfortunate patients. They certainly bring to him for solution a very complex problem, one that he can solve, if at all, only by the most careful and patient study and painstaking work. The writer has not infrequently failed to secure comfortable binocular vision, but, on the other hand, has often been gratified by success.

In those patients who have acquired a strabismus and their present discomfort is due to an uncorrected error in the fixing eye, it has been his habit to correct the refraction error in the better eye and neglect the other. The endeavor to bring it into use by tenotomy, or by advancement operation is usually unsuccessful, and is liable to secure only additional pain and discomfort. With strong convergence, or a wide divergence, the image is readily neglected, but when, as a result of operation, it comes to lie near the macula a disturbing diplopia is produced, to overcome which a constant effort is required which causes distressing asthenopia. Moreover, if by operation, we are successful in securing accurate parallelism of the visual axes, the difference in the size or the improperly focused macular image is more likely to cause disturbance than to give satisfactory vision. It is usually wise therefore to avoid in such cases any effort to secure binocular vision. There are, however, exceptions to this rule. A shoemaker, aged thirty-five, came to the Wills Eye Hospital for relief from severe asthenopia. The left cornea was partially covered by the internal canthus, the strabismus having existed since childhood. The eye was amblyopic and highly hypermetropic. The fixing eye had a moderate degree of hypermetropic astigmatism. He received a full correcting glass for each eye after prolonged use of atropia but without relief to his severe headaches. A free tenotomy was then made on the converging eye, with result of completely relieving his asthenopia, although binocular vision was not restored. Another instance was that of a sister of charity, a teacher, with a very high grade of compound hypermetropic astigmatism in the right eye and a low grade of simple hypermetropic astigmatism in the other. The right eye was

turned upward strongly, and the cornea partially covered by the eye lid. She stated that this eye had never been used. She suffered from constant headache with frequent explosions into violent attacks of so called "sick headache" which forced her to bed in a darkened room. The left eye was corrected, with the result of affording partial relief. The pain was so severe, however, after her day in the school room that she sought further aid. The superior rectus was then divided and the refraction error carefully and totally corrected. Binocular vision was secured, and she has had, now for many years, practically complete relief from her asthenopia.

In patients who maintain parallel visual axes, notwithstanding a wide difference in the refraction of the two eyes, even in cases of antemetropia, actual experience often puts to flight all our theories of refraction and their comfort is secured by a careful total correction of the existing error in each eye. Such glasses are not infrequently worn constantly with perfect comfort. The case books of the writer contain many examples corroborating this statement. For near work, even before the age of commencing presbyopia, it is frequently necessary in these cases to correct the eyes for a common far point of 2.D., or 2.50 D. In the cases of the clergymen mentioned above, they each received full correcting glasses for distance and a calculated glass for near work, e. g. A. L. aged fifty years, O. D.+1.50 D.⌒+.75 D. cy axis 90°, V. 6/vi:—O. S.—1.⌒—1. cy axis 180° V. 6/vi. These were prescribed for constant wear. He received the following formula for near work. O. D.+3.50⌒+.75cy ax. 90° p. r.=2.D; O.S.+1. cy ax. 90° p.r.=2.D. These glasses were worn for two years with comfort, when he returned and received at age fifty-two an additional +.50 for his reading glass.

It is not uncommon to have persons with relatively low grades of H. or M. with astigmatism in one eye, and very high grades on the other, use a full correcting glass for each eye with comfort. In all such patients the attempt should be made to secure their comfort by this means.

In other cases empirical corrections in some unaccountable way secure comparative comfort when more accurately adapted glasses cannot be worn. The following case will serve as an illustration:

Professor M., aged 48, has in O.D.—3.⌒—0.37cy axis 150°, V. 6/vi; in O.S.+1 sph.⌒+3.cy axis 80° V. 6/vi. The nose is turned toward the right side, the left side of the face is smaller than the right, the hearing of the left ear is defective without obvious cause. The left jaw is deformed, and the teeth are many of them gone on that side, while perfect on the right side. He received the above glasses in 1890, and has worn them constantly, enjoying comfortable binocular vision ever since. The reading combination, however, based upon his distance

glasses could not be worn without constant annoyance. After a number of trials with various combinations and careful centering, it was found that with +0.37cy axis 60° over O.D. and the distance glass only, over O.S., he could read comfortably. In other words the left eye was practically abandoned for near work while being used with satisfaction for distant vision, but even for near work he preferred the correction for distance over the left eye to a plane glass.

The writer's experience seems to have demonstrated the wisdom of giving full corrections for each eye in every case, whether in anisometropia of the hypermetropic or myopic type, or in antemetropia. If comfort is not secured by carefully centered glasses, the attempt can then be made to abandon the more defective eye.

THE NON-SURGICAL TREATMENT OF MYOPIA.

BY ALVIN A. HUBBELL, M.D., PH.D.

Clinical Professor of Ophthalmology and Otology, Medical Department of the University of Buñalo, BUFFALO, N. Y.

Myopia, whether *curvature or axial*, is so generally due to *abnormal* changes in the outer coat of the eye, and these, in turn, are so frequently followed by varied, and often serious, complications, that it may be regarded as a condition more or less pathological. When once developed, it is permanent and tends to increase, even to the extent of hazarding the sight through the stretching and disorganization of the retinal tissues, through choroidal disease or hemorrhage in the macular region, through exudates into the vitreous humor, or through detachment of the retina.

Unlike hypermetropia or astigmatism, it is not a congenital, but an acquired defect. A predisposition to it may exist in the infant; but practically it always appears after birth, and generally during the period of active growth and development of youth and adolescence. It is brought on by certain well defined causes, which it is more or less possible, although not always entirely practicable to remove.

Having before us, then, a pathological state which is incurable, and which tends to become serious, and one that is dependent upon well-ascertained and removable causes, prevention becomes preëminently important, both as regards its onset and its increase, when once developed.

Prophylactic treatment of myopia can only be administered in the light of the knowledge of its causes. These may be divided into predisposing and determining. The predisposing causes are such anatomical confirmations of the orbit and extra-ocular muscles and such make-up of the structures of

the eye itself as may be transmitted from myopic, or perhaps emmetropic and hypermetropic parents to the child, or such vulnerability to the action of unusual forces found in the growing child, or such lack of resisting power of the ocular, as well as other tissues of the body, as accompanies want of bodily vigor and strength. The determining causes are such as are directly active, and consist essentially in *too near, and, at the same time too continuous ocular work.* Whatever theories may be advanced in explanation of the mechanism of the forces which produce myopia, whatever contributory conditions may foster its development, this casual condition is undisputed. Practically, the recognition of this fact is the basis of all prophylaxis, which may be briefly stated to consist in enjoining that objects shall be kept at a reasonable distance from the eyes, and that the visual effort shall occasionally be relaxed, and not continued for too long a time.

The question may be asked here, "What distance may be regarded as too near, and what time as too long?" An object, brought within a plane of fourteen or fifteen inches distant from the eyes, may be said to be too near for continuous and habitual work. Any time is too long that exceeds two or three hours of continuous near work, and in special cases one hour is too long. There is no doubt that perfectly normal eyes can, without harm, do close work for two or three hours, if a rest is then given them of about the same length of time before work is resumed again. In this way such eyes can aggregate a use of eight or nine hours daily quite safely. It would be unsafe, however, to undertake this maximum of time with any predisposition or increased susceptibility to myopia through heredity, active growth of the body, or debility. It should not be overlooked that myopia may also develop, even when the object is placed at the proper distance, if the work is continued unremittingly for many hours, day after day.

The disposition to hold objects too near the eyes arises from several causes, some of which may be referred to. In children and young people in whom the accommodation is active and strong, objects are brought "abnormally" near the eyes, because of the facility with which it is done, and the better definition of outline obtained. This often happens, even in cases where the vision is normal, or perhaps super-normal, both in emmetropic and hypermetropic eyes; it is almost universal where there is spasm of the ciliary muscle, or where the vision is subnormal from congenital amblyopia or uncorrected astigmatism or hypermetropia of high degrees, or where it is impaired by intra-ocular or other disease. Work on very small objects, or with insufficient illumination, is also a frequent cause.

In the one case objects are approximated too closely because of its facility, in others because of its need, and in all because of the increase in size of the retinal images, and, therefore, an increase in distinctness of vision.

The use of the eyes on near objects for a time exceeding that which may be considered safe, arises from the nature of tasks imposed, either voluntarily or by the demands of school life, or by the necessities of occupation. Many young people voluntarily spend hours, without remission and often in poor light and in faulty positions, reading the fascinating "literature" so generously adapted to their comprehension. The primary and high schools of the country set curricula before their pupils, including, besides the study of text-books, an enormous amount of writing, and in some grades much auxiliary reading. These requirements necessitate near and almost constant use of the eyes for many hours during the day, and oftentimes during the evening, as well. The same is true of many occupations, such as engraving, copying, fine needlework and many of the mechanical trades.

Without entering into minute details, it may be stated in general that to remedy the tendency to too near approximation, objects, especially the print of school books, should be of sufficient size to be easily and clearly distinguished at fourteen inches or more from the eyes. There should be ample, but not too intense, illumination, and the eyes should be protected from its direct action, either by the position of the head or body, or by a shade on the forehead or before the eyes. Seats and desks, or chairs and tables, should be so adjusted as to afford a healthful, comfortable and erect position of the body, and a suitable rest for the object, placed in a slanting position, and at a legitimate distance from the eyes. When the vision is subnormal from astigmatism or hypermetropia, it should be raised to the normal standard, if possible, by carefully adjusted, correcting glasses. In cases of amblyopia, or impaired vision from any cause, the objects should be correspondingly larger, or else the amount of near work should be greatly lessened. Spasm of the ciliary muscle should be relieved by instillations of atropia, rest, and possibly glasses. Any mere habit of approaching objects too near or inclining the head too much should be broken by discipline or, perhaps in urgent cases, by some of the well known devices for maintaining the head in a proper position.

To lessen the time of close ocular work is not always an easy thing to accomplish. It may be done in cases of unnecessary reading and work, and much of the writing and outside reading required of school children could be profitably dispensed with. But when a person is engaged in near-work occupation by the necessity of earning a livelihood, and can-

not readily turn to, or obtain, "long-range" work, it must be continued. In such cases, and indeed in all cases, the visual effort should be relaxed for two to five minutes at least every quarter or half hour by looking into the distance.

When vision is below the normal standard of acuteness and cannot be improved, such regulations of school tasks, reading and fancy-work, and such choice of occupations should be made as will relieve the eyes from long and unremitting close application.

The maintenance of good health and bodily vigor is also a most important factor in the prophylaxis of myopia.

Could eyes throughout civilization be relieved of close and long continued use, the ordinary form of myopia would disappear. But in our present industrial relations this is impossible; but very much can be done in this direction with the result of greatly diminishing the frequency of a condition fraught with so many unhappy consequences. Physicians, educators and philanthropists have large responsibilities in this matter.

The treatment of developed myopia has to do with the prevention of its increase, the complications which may follow and the extension of the range of vision. To prevent its increase, and therefore those muscular "insufficiencies" and intra-ocular diseases which supervene upon its higher grades, the same precautions should be taken as in preventing its onset. Ocular work should be kept at proper distance, and it should not be continued beyond what may be considered a normal limit of time; or it should, perhaps, in markedly progressive cases, be greatly lessened, or discontinued entirely for a period of months, or possibly years. To extend the range of vision, correcting glasses are necessary, and these have the further important effect of facilitating the maintenance of near work at a proper distance, and of preserving the strength of the ciliary muscle and the normal relation between accommodation and convergence.

For more than a quarter of a century the teachings of the immortal Donders and later those of the distinguished Landolt have been largely accepted in the treatment of myopia. Their powerful authority has passed with few challenges, and to-day very many, perhaps the great majority of ophthalmologists are under-correcting myopia for near work. It is impossible within the limits assigned to this paper to review the arguments upon which this practice is based. These are set forth fully in the works of Donders[1] and Landolt[2], to which the reader is referred.

[1] On the Anomalies of Accommodation and Refraction of the Eye. By F. C. Donders, M.D., London, 1864, page 420 et seq.

[2] The Refraction and Accommodation of the Eye and Their Anomalies. By E. Landolt, M.D., Philadelphia, 1886, page 483 et seq.

Donder says that "in very slight degrees, from 1/60 (0. 50 D.) to 1/18 (2.25 D.), we may leave the myope to himself, in higher degrees the neutralization. * * * In the highest degrees, from 1/5 (8.00D.) upwards, perfect neutralization is not pleasant for close work. * * * We should then rather bring *r* (remote point) to 12 or 16 inches." Landolt, after urging the determination of the real degree of myopia, lays down the rule that "A MYOPE MUST BE PROHIBITED FROM WEARING A CONCAVE GLASS FOR ANY DISTANCE AT WHICH HE CAN SEE CLEARLY WITHOUT ACCOMMODATION." To this he adds: "We will, therefore, guard against giving their correcting glasses to slightly myopic persons, and, generally, to all who work at a distance less than, or equal to that of their punctum remotum." Both Donders and Landolt advise against prescribing concave glasses which over-correct the myopia. Donders says: "While emmetropic and hypermetropic eyes do not readily experience any injury from the use of unsuitable glasses, this may in myopes, particularly on account of the morbidly sensitive condition of the eyeball, and of the tendency to get worse, be very dangerous. There exists in general a dread of the use of too strong glasses." Landolt puts great stress on spasm of the accommodation as an essential factor in the production and increase of myopia, and seems to be in constant fear that fully-correcting or over-correcting glasses will induce it. He says: "We have already seen, when discussing hyperopia, what complications result, in choosing spectacles, from this intervention of accommodation. Its influence is no less important to consider in the correction and adaptation of myopic eyes. The rôle which the contraction of the ciliary muscle may play in the etiology of malignant myopia makes this easy to forsee." He also seems to be guided in prescribing glasses very much by the wishes of the patient. "It is rare," he says, "that a myope whose defect is of medium degree and whose age is not advanced, is pleased with the full correction of his myopia." "Extreme myopes very often refuse any sort of permanent correction." He then proceeds to explain his practice at length, and even endeavors to establish the relation that should subsist between convergence (in meter angles) and accommodation or no accommodation.

Now facts are generally safer than theories in the practice of medicine or any of its departments, and such facts as have been presented by Foerster[1] of Breslau, and others, have positively demonstrated that concave glasses which over-correct myopia are not injurious, either in favoring its increase

[1] Foerster, Trans. Heidelberg Ophthalmological Congress, 1883; also Knapp's Acrhives of Ophthalmology, 1885, page 399 et seq.

or in developing disease. On the contrary, it has been shown that such glasses, in fact, tend to arrest its progress by compelling a longer object-distance. Even Donders recognized that "when persons with moderate degrees of myopia have in youth accustomed themselves to the use of neutralizing spectacles, the eyes are in all respects similar to emmetropic eyes, and the myopia is, under such circumstances, remarkably little progressive." Let us take the facts, then, empirical though they may often be, and harmonize theories with them, if necessary.

Facts have established that, normally, there is an intimate relation between accommodation and convergence, that with a stimulus to the one, there goes a stimulus to the other. Take away, then, the stimulus to accommodation, as in myopia, and there is lost an essential stimulus to convergence. The result is a tendency to, and finally a development of, insufficiency of the internal recti muscles. On the other hand, if the convergence is maintained by an active stimulus, an associated stimulus, perhaps much inhibited, is transferred to the accommodation with the effect of causing a true spasm, perhaps slight, of this function. This compels even a nearer approach of objects to the eyes than would otherwise take place, and a myopia becomes aggravated. It may be true that nature will permit a certain amount of dissociation between accommodation and convergence, but it can only be done at a sacrifice somewhere. The safest practice, then, is to balance as perfectly as possible the stimulus of accommodation with that of convergence, and this is done in myopia by increasing the accommodation by the use of correcting, concave glasses.

It is time to doubt the importance that has been placed on spasm of the accommodation in the production or increase of myopia. Every case of hypermetropia below forty years of age has spasm, more or less, of the accommodation. The same condition is present in every case of over-corrected myopia. But in neither case does it produce or increase myopia till after it becomes sufficient to force the far point of vision much nearer than "infinity," and thereby necessitating too close approximation of near work. If absence of accommodation tended to prevent myopia, every case exceeding two or three diopters would carry within itself its own remedy; but facts again prove that this is not true. Practically then, as well as theoretically, accommodation is not prejudicial to a myopic eye—is indeed beneficial, and should be preserved and exercised within the same limits as in any other eye, barring out, of course, pronounced diseased conditions.

Normal range of vision is as desirable for a myope as an emmetrope,

and its advantages far out-weigh in most cases the diminution of retinal images by correcting glasses. The normal relation between accommodation and convergence is as useful and essential to the myope as to the emmetrope, for it guards against muscular insufficiences and assists in preventing an increase of the myopia.

The optical treatment of myopia, then, should be begun as early as possible, and at least as soon as it reaches or exceeds half a diopter. Its exact amount should be determined with the eye under the influence of a cycloplegic, and the full-correcting glasses should be prescribed. These should be worn both for far and near when the patient is under the presbyopic age and the ocular structures are not actively diseased, and when the power of accommodation has not been impaired by reason of the myopia having remained uncorrected for a considerable period of time. In cases of young people, in whom the accommodation has thus been impaired or lost, and who are engaged in near work of considerable amount, a second pair of glasses should be used for this purpose, varying in strength from one to three diopters less than those for distance, according to the state of accommodation. Those for near should be gradually increased in strength till the full-correction is reached, and then these should be used for all work. In this way the accommodative power is entirely regained, and the eyes, with the glasses on, are used the same as though they were emmetropic. It is not a result always easily accomplished, but the benefits derived atone many fold for the discomforts of the effort.

When presbyopia appears, weaker glasses are needed for near, adjusted in accordance with the rules governing the correction of this condition in emmetropia.

When myopia is so extreme that its full correction, although giving, perhaps, nearly or quite normal vision, renders the retinal images so small that near objects, such as ordinary print, are clearly distinguished only with great effort, weaker glasses, according to the circumstances, should be used for near work. Sometimes in these cases the visual effort for far, even, is so great with glasses that fully correct, that the indistinctness of an under-correction is much preferable to its discomfort, and weaker glasses should then be worn for distance, as well as near.

When pathological changes have reduced the acuteness of vision considerably below the normal standard, the optical correction of the myopia must be governed largely by the conditions present. Sometimes nearly a full correction is acceptable, sometimes only a partial one, and sometimes none.

The non-surgical treatment of such complications of myopia, as cho-

roidal disease, retinal hemorrhages, vitreous opacities, and detachment of the retina is so negative that its consideration need not occupy us at this time. It may be summed up in *ocular rest and hygiene.*

As regards the muscular insufficiencies attending myopia and the "muscular asthenopias" to which they give, their non-surgical treatment consists in wearing prisms combined with the spectacles, or in decentering glasses, which has the same effect, and in the "exercise" of the weakened muscles by prisms or other means. Prismatic spectacles often give great relief, but it is so difficult to change an established abnormal innervation, or, in other words, to break up an old "muscular habit," that prismatic or gymnastic exercises must be begun early if relief is to be expected from them.

This whole subject is so large that much more might be said upon it, but these brief considerations must suffice for this occasion. It must not be expected that anything new can be said at the present time on the topic before me. But it is expedient, nevertheless, to emphasize anew the importance of the prophylaxis of myopia, and to urge what seems to me to be an optical treatment of it more in consonance with verified facts and best results.

THE SUBJECTIVE METHOD FOR THE DETERMINATION OF THE REFRACTION.

BY FRANCIS VALK, M.D.

NEW YORK CITY.

In the estimation of the refraction of the dioptric media and the correction of the errors with glasses, the objective method is of great importance, so much so, that all oculists should be able to order glasses, in the majority of cases, by the objective method alone. This requires a vast amount of experience, with the education of the examiner's eye, to appreciate and to estimate the many and various conditions in the refraction of the examined eye. Hence, many of us must depend, in great measure, upon the subjective methods for the diagnosis of what is the refractive condition in the case to be examined.

It has been stated that the trial case is the chief element in the estimation of the refraction, as we must consult our patients' wishes and comfort in the wearing of the glasses and so we are apt to decide the question by the glasses that they prefer. Be that as it may, I never order glasses

that a patient may like unless I can verify their preference by all the objective methods.

Although we may give the subjective methods a second place in the estimation of the refraction, it is one of great importance; and these methods should be used in a practical way, that we may obtain rapidly the refractive condition of the media.

Of all subjective methods the trial-case stands first, and it is useless to attempt this work without one of the best, with a full set of spherical and cylindric glasses. Armed with this, we can test our patients intelligently and read the indications as we proceed.

The test-type should be placed in a well lighted room and, if possible, have the type illuminated with artificial light. We should have two or more cards on the wall at a distance from the patient of twenty feet. I use in my office three cards fastened on the wall like the leaves of a book, so that they can be rapidly changed, frequently using a different card for each eye. The patient to be examined is placed in a chair with the back to the light, and we record the binocular vision.

Before proceeding to illustrate the test, we must remember that the age of our patient will have a very decided influence on the acuity of the vision and the concealment of an error of refraction. In old people, beyond the age of forty years, the action of the ciliary muscle will have very little influence in the acceptance of the proper glasses, while on the other hand, in young persons, the action of this muscle will frequently conceal an astigmatism, particularly when we are using Green's test-card with the radiating lines, and the astigmatism is hyperopic. In these young persons we must also be on our guard for accommodative myopia, the clonic spasm of the ciliary muscle, shown by the vision being improved by the use of weak minus glasses without perfect vision. We now proceed to test each eye separately with the trial-case. Covering one eye with the shield, we note the acuity of the vision in that eye; if normal, it equals $\frac{20}{20}$ or better, or it may be less. In my work I consider $\frac{20}{15}$ as normal vision. If the vision is normal we have an indication of simple hyperopia, or some form of low astigmatism, and we should not look for myopia unless the vision is less than $\frac{20}{100}$, and they can read No. 1 Jaeger test-type.

Having found the vision equals $\frac{20}{20}$ or better, we now proceed to bring out the refractive condition by the "trial by glasses," proceeding first and always with the *plus* sphericals. If accepted, we place the glasses successively before the eye until we find the strongest plus or convex glass through which the vision will be the same or will be improved, as there

must be no blurring of the letters with this glass. The glass used will then represent that a certain amount of hyperopia is present, that may be in only one meridian, as cases of hyperopic astigmatism will frequently accept these glasses, but this is shown as we develop the true refractive condition.

Using this strong plus spherical we now place over it a weak *plus* cylindric glass with the axis placed horizontal, and then change the position of the axis 45° each time that it is moved, and note if the vision remains the same, is improved or is made worse, with the position of the axis, in which the vision is best. Finding this position, with the strongest cylindric glass we note if the vision is the same or better. If improved then we must have *compound hyperopic astigmatism* and the glasses used indicate the degree and the axis required.

On the other hand, if the vision is not improved or diminished we now proceed to use minus cylindric glasses in the same way, and if the vision is improved we add stronger glasses until we get the best vision. If the minus cylinder is weaker than the plus spherical we still have compound hyperopic astigmatism, but of a less degree and a simple calculation will show the glass needed: as if we use a + 1 D. ⌒ − 0.50 D cyl. ax. 180° this equals + 0.50 D. ◯ + 0.50 D. cyl. ax. 90° = the glass required.

Again, if this combination does not give us the required vision, we continue to add the minus cylindrics until we have one of the same refractive power as the plus spherical first placed before the eye, and this giving perfect vision we now have *simple hyperopic astigmatism*, and a moment's calculation will give us the plus cylindric glass and the axis required; as + 1 D. ⌒ − 1 D. cyl. ax. 180° equals + 1 D. cyl. ax. 90°.

In case this trial will not bring the vision up to $\frac{20}{20}$, we proceed to place stronger minus cylindrics before the eye until we do find the vision normal, and now we have brought out the condition of *mixed astigmatism*. From the glasses used we may readily estimate the degree of hypermetropia and myopia in the two principal meridians. I would illustrate that in this way: R. E. V. = $\frac{20}{40}$, with + 1 D. = $\frac{20}{30}$; now we add the minus cylinder, say − 2 D. cyl. ax. 180° and this glass gives V. = $\frac{20}{20}$, or better. Then we have hyperopia of 1 D. in the horizontal meridian, with myopia of 1 D. in the vertical meridian, and we can order whatever combination of glasses that will give the same result. In ordering glasses for mixed astigmatism, I always prefer to use the minus sphericals combined with the plus cylinders, as I think this combination gives the best periscopic vision.

If the addition of the plus or minus cylinders as above described tend to make the vision worse, then we must have *simple hypermetropia* and the glass may be ordered accordingly.

In case the vision is very much diminished, and we can find no improvement with the plus glasses, we may now use the minus sphericals, using the weakest glass that will give the best vision, and if necessary, then proceed to place over this, first plus cylinders to bring out a low degree of *compound myopic astigmatism*, and when we have the plus cylinder the same as the minus spherical with vision normal, we have *simple myopic astigmatism*. But if these glasses make the vision worse, now we try the minus cylinders with the axis placed at the different positions of the arc of the circle, until vision is normal, when we have demonstrated compound myopic astigmatism of a higher degree and the weakest spherical combined with the weakest cylinder will give the glass required. Again, all cylindric glasses failing to improve the vision then we must have *simple myopia*.

The foregoing method with the trial glasses and Snellen's test-type, with reasonable care and trial, will in most cases indicate the refractive condition of the dioptric media and the glasses required; but following this subjective test we may use others as confirmatory and to verify our results. Chief of these I would note Green's test-card with the radiating lines. The only objection that I may note in reference to this test, is that in young persons, with the lens elastic and the ciliary muscle active, they will often state that they see all the lines clearly in every meridian, particularly so in cases of low hypermetropic astigmatism, but in using the trial-case, as before mentioned, this objection will disappear and they will indicate the lines that will appear most distinct as we place the plus glass before the eye.

We will then proceed to test the refraction in reference to the appearance of the lines; always remembering that the lines will be seen most distinct in the meridian of greatest ametropia, consequently the axis of the correcting glass will necessarily be placed at right-angles to the position of the lines.

In simple myopic astigmatism this test will always be useful, as now they cannot conceal the astigmatic condition and in most cases they will readily note that the vertical lines are very clear, at once indicating myopia in the vertical meridian. These lines are seen because the rays of light in the horizontal meridian or plane are brought to a focus on the retina with the eye at rest, as this meridian is emmetropic; thus the edges

of the vertical lines are clear, while the rays in the vertical meridian overlap but simply render the ends of the lines indistinct.

By the same rules, if the greatest curve of the cornea is in the horizontal meridian then the corresponding lines will be clear and in both conditions the weakest concave cylinder glass, with the axis placed at right angles to the lines, which will make all the radiating lines clear, will give the desired degree of astigmatism and the axis required.

Another confirmatory test with the trial-case, is the use of the stenopaic slit, by which we cut off most of the rays in one meridian or plane and estimate the refraction in the other. Here we find the position of the two meridians that give the best and the worst vision at right angles to each other. Selecting the meridian, in which the vision is best, we proceed to test it with the trial glasses that will improve the vision, and then test the other meridian in the same way. As we note the vision and the glass used in each meridian we can readily calculate the refractive condition and the glass required.

It has been suggested that we should, in all cases, endeavor to measure the astigmatism first, but this is very difficult to perform unless we use some of the objective methods first; so I prefer to find the axial ametropia and then work out the astigmatism, hence I have endeavored to illustrate a method that may develop the refractive condition as we proceed with the subjective test. I am well aware that the objective methods, particularly that of Retinoscopy, will rapidly indicate the astigmatism and the axis of the correcting glass, but to be proficient in the use of the Retinoscope requires constant practice, while the method described will rapidly indicate the refractive condition to those not familiar with the objective methods.

The demands of civilization are so great at the present day, requiring exhaustive and constant work for the eyes, and the refractive conditions of the dioptric apparatus are so extremely complicated, particularly in the low degree of astigmatism, that the day of the traveling optician and the use of Optometers and Refractometers is surely passing away; while the correct fitting of glasses for the improvement of the vision and the relief of reflex symptoms must require the services of the skilled oculist. He will be required to make a correct diagnosis, in which, all observers should agree, is similar to a mathematical problem, and such work cannot be done by the man who says, as the office bell rings, "Oh, here's another refraction case," but by the most careful estimation of the refraction we will correct an error that will be permanent and satisfactory.

This may require many moments of painstaking work but will meet its reward in the end.

A short time ago a case was sent to me, asking if I could find any astigmatic error, as the last examiner could not find such a condition and yet he had noticed that the patient was wearing a glass of — 12 D. ◯ — 2 D. cyl. ax. 90°, in each eye. Now a patient with so high a degree of myopia may accept a cylindric glass at almost any axis, but after the most careful examination I was compelled to decide that this was a case of simple myopia, (axial) and consequently the glasses could not be correct, while the patient never was satisfied with the glasses since they were ordered, and I gave him simple concaves.

In conclusion, while I have endeavored to outline the procedure that I consider the best in the subjective examination of the refraction, yet in my own work, while I use the same method, I never order the correction until I am satisfied that the results of the subjective method shall agree, to all intents and purposes, with all the best objective tests.

Under these conditions we will seldom have to change our prescriptions for glasses nor fail to give the desired relief.

146 East 37th Street.

(1.)—SOME POINTS CONNECTED WITH SARCOMATA OF THE CHOROID. (2.)—GUMMA OF THE CONJUNCTIVA.

C. DEVEREUX MARSHALL, F.R.C.S.
Pathologist to the Royal London Ophthalmic Hospital.
LONDON, ENGLAND.

Illustrated.

Malignant tumors of the eyeball are always of great interest both to the surgeon and also to the pathologist; this to a great extent arises from the small amount of knowledge we possess with regard to them. They nearly always present some difficulties to the surgeon from the point of view of diagnosis, while their ætiology is practically unknown.

I shall in this communication confine myself almost entirely to the pathological side of the question, and as I have recently had occasion to examine a few specimens which are rather out of the common, I hope that the consideration of them may prove instructive.

By far the larger number of cases we meet with occur in eyes which have until recently had good sight, though it is by no means uncommon

to find the history that the eye has become blind gradually, and often so gradually and painlessly that the patient was unaware of any defect until the good eye was closed, and then the defect became at once apparent. If such a case has gone on for a long time, it may suddenly become hard and painful, and all the symptoms of an acute glaucoma come on rapidly.

This, however, is not the only way in which a growth manifests itself, nor are they always good seeing eyes that become affected. Sometimes blind eyes are found to contain growths, and one occasionally meets with eyes which have been blind and divergent a very long time, becoming affected, and even an eye which has been shrunken for years and contains bone becomes the seat of a tumor.

The following case is a typical example of the latter condition:

Miriam W., aged 50, gave the following history: Thirty-six years ago the right eye was injured with a skipping rope, and after the accident the sight completely left. The eye then became shrunken, but remained absolutely quiet and free from pain until eighteen months ago, when, without any apparent cause, it became inflamed and irritable; there was no injury or exposure or anything to account for its becoming painful. The pain has been severe during the last two or three months before admission. When seen, the eye was shrunken, hard and very painful on pressure. There was, however, nothing to indicate the true nature of the condition. As the eye was useless, as well as very painful, excision was advised. On removal the following condition was noted: The cornea is very small and there is a deep arcus around it. The iris is not visible, but a dense white calcareous lens is seen in the pupil. At the upper and back part of the sclera there is a very large bulging melanotic mass, a process of this surrounds the optic nerve, which is itself of a very dark color. The tumor, which surrounds the nerve, has been cut through, so that obviously the disease extends beyond the point of section. As soon as this was recognized the whole contents of the orbit was removed. An antero-posterior section of the eye was made. It was then noted that the eye is solid throughout and on the posterior part of the sclerotic there are two large staphylomatous bulgings which are composed of coal black melanotic growth. The interior of the eye is occupied by a dense mass of bone, measuring 13 mm. in one direction and 5.5 mm. at right angles to its long diameter. This has evidently become developed in the choroid which is entirely surrounded by a dense sarcomatous mass. The optic nerve is surrounded by the mass. The lens is hard and calcareous, but the other anatomical structures of the eye are unrecognizable.

This is a typical example of the folly of a patient allowing a blind and painful eye to remain for a very long time without seeking relief, and such a case should be a warning to surgeons, many of whom are inclined to err on the side of being too conservative, in preserving eyes which are blind, useless, and perhaps even disfiguring. One might be perfectly certain that an eye which has been blind for a number of years

is very unlikely to become painful unless some gross change has occurred, and if this be the case, the sooner such an eye is parted with, the better.

Some people talk about the occurrence of new growths in blind bony eyes as commonly happening, and no doubt a fair number of cases have been seen, but still one does not often see such. One might perhaps look upon them as being relatively common; for when one considers the few cases there really are of persons possessing bony eyes, the occurrence of one case in about one hundred which I have examined, is perhaps not such a very low proportion after all, and fortunately sarcomas of the choroid are by no means common, when one finds at Moorfields about one sarcoma in between three thousand and four thousand cases.

Without in the least wishing to multiply cases, one cannot help mentioning the following, which shows how a tumor may be masked to external appearances and may yet be making rapid progress in the orbit:

This patient was a man aged 55, whose left eye had been defective and divergent for at least twenty years. For the last three or four years he had had attacks of pain and inflammation in the eye, but delayed having anything done. There was nothing whatever to indicate the fact that there was anything further the matter other than subacute inflammatory attack. The eye of course was quite blind. It was decided to remove it, and then for the first time the true nature of the condition became apparent. It was found that after the muscles were divided, the eye refused to come forward. It was, however, removed with some difficulty, when it was found that a dense coal black sarcoma had destroyed the sclerotic and was projecting into the orbit. On opening, the eye was solid and completely full of a melanotic growth. The center was soft and broken down, while the rest was harder, the sclera was much thinned and the growth visible within it, while at one place near the optic nerve, it has completely penetrated, and a portion has been left in the orbit.

This again illustrated the fact that should never be forgotton, viz.: that it by no means always happens that the growths penetrated the sclera in a position which can be seen as frequently as it does so much farther back.

Now the position in which these intraocular growths penetrate the sclerotic follows a definite plan, and that is, they find their way through the places which are pierced by vessels and nerves. As one would expect, the position of the large venæ vorticosæ is one of the most common places where this occurs, and if this is so it does not take long to recognize the probable nature of the case. Another common place for tumors in the ciliary region to penetrate is along the line where the anterior ciliary vessels run. This again is particularly easy to see, and so one finds it very uncommon to have a large growth projecting in this situa-

tion. The worst place of all for it to occur is in the situation where the posterior ciliary vessels penetrate, as was the case in the patient mentioned above. This may go on for months before giving rise to any marked symptoms other of course than blindness, with more or less detachment of the retina.

In this case, however, we are almost certain to have acute tension sooner or later, as the growth is far back away from the ciliary body. One cannot say how this is, but the fact remains that we are far more likely to get increase of tension in cases in which the ciliary body is not affected than in cases in which the growth is far forward.

The point was most obvious in a large number of cases examined by the author, the results of which were published in the *Transactions of the Ophthalmological Society of Great Britain* for 1896, when, out of a total of fifty-three cases of sarcomata not affecting the ciliary body, 67.92 per cent had a greater or less increase of tension; while in twenty-eight cases in which the ciliary body was affected, the percentage of cases showing glaucomatous changes was only 35.71.

On further examination, it was found that the high tension was invariably accompanied with a closed angle of the anterior chamber, and that this closure was far more frequent in cases of choroidal growth occurring far back in the eye than in those in which the ciliary body was involved in the tumor.

Now there must be some reason for this, though certainly it is the reverse of what we should expect to find. One would certainly think it probable that a sarcoma growing far forward would be more likely to cause the anterior chamber to become shallow and the angle restricted, than when the growth is far removed and is in the back of the eye. Doubtless this would be the case supposing this were all, but we must remember that the ciliary body takes a most important part in the nutrition of the eyeball, as should anything interfere with its function, changes of a greater or less degree are sure to occur. It is quite easy to imagine that, even supposing the angle of the anterior chamber be very much narrowed as the result of a growth far forward, the presence of the tumor may not only aid the filtration of fluid from the chamber but may also tend to prevent the angle entirely closing, and thus prevent the development of an acute glaucoma. This seems to be the most likely explanation of the condition which is at first sight the reverse of what we should expect.

The only way of elucidating the various interesting points in connection with this important class of cases is for surgeons to carefully examine

their cases, and should they be unable to do so themselves, our knowledge would be greatly increased if all eyes were subjected to strict pathological examination, as one so frequently finds most interesting things in eyes and tissues in which we least expect to do so.

Gumma of the Conjunctiva.—One is familiar with certain new growths occurring in the conjunctiva, and perhaps rodent ulcer starting in the lids and secondarily affecting the conjunctiva is one of the most common. Intense thickening of the conjunctiva as the result of tertiary syphilis is by no means common. And indeed this thickened condition of the conjunctiva is sometimes seen during the occurrence of secondary syphilis. A case of this sort was under treatment at Moorfields for two months during the time the author was house surgeon; but although the patient had numerous signs of secondary syphilis and was vigorously treated for this, yet the infiltration of the conjunctiva made little or no improvement during the time he was under observation. The case was reported in the *Trans. of the Ophth. Soc.*, 1894.

In Volume XI of the same Transactions, there are two cases reported and figured, one by Silcock, of a gumma occurring in a patient aged forty-five, who had had relapsing iritis and gummata in various parts of the body for some years. There was in this case a large swelling at the outer part of the conjunctiva. It disappeared in about a month under the influence of mercury and iodide of potassium. The other case recorded by Lawford, occurred in a man, aged forty-eight, who had had syphilis twenty years ago. There was on the temporal side a round, smooth subconjunctival swelling close to the external rectus muscle, and had been present for two or three years.

The following case is interesting, inasmuch as the eye was obtained for pathological examination and the infiltration very diffuse:

It was from a man, aged seventy years, with a specific history who was suffering from hemorrhagic retinitis; he then developed subacute glaucoma. The eye remained painful for about two years and then ceased to be troublesome for about a year, again becoming painful after this.

There was then enormous thickening of the subconjunctival tissue all round the cornea, which extended far back.

The eye being blind and painful, was excised.

During the operation it was found that the muscles and fasciæ were greatly thickened, and resembled a condition of solid œdema. It was not adherent to the globe.

On microscopic examination, the whole of the subconjunctival tissue is enormously thickened, and so densely infiltrated with small round cells that its structure is not visible; these cells are packed together. Running through the mass are numerous blood channels, but there are no well formed vessel walls.

Near the surface the cells stain deeply, and are apparently of recent origin and actively growing, while those in the deeper parts of the growth do not take the nuclear stain at all well and are apparently in a somewhat degenerate state. The growth of cells pushes itself beneath the corneal epithelium at its margin. The sclerotic is somewhat infiltrated, though, owing to its density, the cells do not travel far into it; the growth is in many places broken down with hemorrhage. The iris is very greatly atrophied, it is thin and adherent to the cornea on both sides for a considerable extent, thus completely closing the angle of the anterior chamber. It is infiltrated and has evidently been much inflamed. There is considerable ectropion of the uveal pigment. Some of these features are shown in the accompanying photograph, taken under a two inch and two-third inch objective without eyepiece.

Krauss claims optic neuritis to be present in 90 per cent. of all brain tumors. It is oftener present in cerebral than in cerebellar tumors. The location of the tumor exerts but little influence over the appearance of the nerve. The size and nature of the tumor has but little influence over the appearance of the neuritis. Slow growing tumors are less likely than rapid ones to be accompanied with neuritis. He believes that unilateral choked disc is indicative of disease in the hemisphere corresponding to the eye involved.

Ocular Affections of Utero-Ovarian Origin.—In ocular affections connected with utero-ovarian trouble—which are more frequent than usually supposed—Professor Mooren relieves the tenacious hyperesthesia of the retina with the following: Potassium bromid, 4 grams; lupulin, 6.5 grams; pulv. rhubarb, 1.5 grams; extract of centaurea, q. s. Make into 120 pills. Take three pills three times a day. If the ovary is the cause of the ocular troubles he gives: Atropin sulphate, 3 centigrams; licorice powder, 2.5 grams; extract of licorice, q. s. Make 60 pills. Take three pills a day. If the reflex ocular irritation depends upon some simple functional disturbance in the uterus or ovaries he administers Paracelsus' elixir in the dose of two half teaspoonfuls a day for several weeks, in the case of robust patients, otherwise reducing this amount to a quarter teaspoonful, or merely several drops during the few days preceding the menses. A copious metorrhagia may induce a serous effusion of the retina, or a neuro-retinitis, which are relieved by cold compresses or ice to the back of the neck, with leeches to the mastoid epiphyses and saline purgatives, if necessary. Local treatment to remove the cause in all cases. —*Semaine Méd.*, September 28.

THE

OPHTHALMIC RECORD.

A MONTHLY REVIEW OF THE PROGRESS OF OPHTHALMOLOGY.

VOLUME VII. CHICAGO, DECEMBER, 1898. NO. 12. NEW SERIES

EDITORIALS.

VISUAL REQUIREMENTS FOR ENTRANCE TO WEST POINT.

That the government should accept only the flower of American manhood to prepare for military duty, should seem wise to any thinking mind. Physically and mentally, the accepted cadets should be above criticism. Were not such the case, these cadets who are some day to fill the most important official positions in the army, would by virtue of their own shortcomings permit the standard for admission to the ranks to be lowered. An error of refraction of a kind that will lower the distance vision is a physical defect. The government makes it a disqualification in the entrance examination at West Point. While we recognize the wisdom of accepting well educated, and physically perfect men who have good eyes, the question arises, what are good eyes? The government insists that the eyes must be free from disease, and that the vision must be 15/20 in at least one eye, and not less than 10/20 in its fellow. The test is to be made without glasses. We all know that the emmetropic eye is extremely rare. The government evidently recognizes this fact, inasmuch as perfect vision is not demanded. It is a rule of the examination that because glasses will raise the impaired vision of the ametropic eye, it shall have no mitigating influence in favor of the candidate. Yet, notwithstanding an error of refraction, if the candidate has sufficient vision to squeeze through, he can the next day put on his glasses and continue to wear them the remainder of his days. This would seem to be unjust. Given two candidates of equal physical development with the exception of their eyes. One has two dioptries of hypermetropia; the other two dioptries of astigmatism. The former is able to accommodate for his refractive error and pass with perfect vision. His companion fails because

of vision of 1/3. Take these two men at the age of fifty-five, at an age when they will have reached important positions in the army, and it will be found that without glasses, the man with two dioptries of astigmatism will have better distance vision than the man with two dioptries of hypermetropia. This is where the examination is faulty. If it is desirable for the accepted candidate for West Point to have vision of 15/20, the accommodation should be suspended with a cycloplegic and the vision tested with the eyes in this condition. This will bring into prominence errors of refraction that would otherwise be overlooked and would require correction by glasses because of asthenopic symptoms or lessening of distance vision resulting from accommodative failure incident to age. If glasses are not considered an impediment to military proficiency, then within a certain limit ametropia should not disqualify. As the requirements now stand, glasses are considered an impediment, or their use would be permitted at the time of examination. It is evidently the desire of the government that the army shall not be bespectacled. We quite agree with the government. In time of peace only perfect physical specimens of manhood should be accepted for military education at West Point. The examination of the eyes should be conducted with the accommodation suspended, when refractive errors which may in later years prove a menace to vision unless corrected by glasses may be easily detected. M. B.

THE NEGLECT OF OPHTHALMOSCOPY.

The perfecting of skiascopic methods, the better understanding of ophthalmometry, and the recent improvements in those instruments that render the objective measurement of the refraction of the human eye comparatively easy and accurate, have been accompanied by some serious drawbacks.

That one might be able to determine exactly the refractive state of a patient's dioptric media without his aid was, in former years, justly regarded as a consummation devoutly to be wished, and now that we have so decidedly overcome the difficulties of the task, and are indeed able to accomplish it easily and readily, must surely be regarded as a triumph of modern ophthalmic art. There is, however, this objection to several forms of objective measurement—it teaches the observer, while paying much attention to the refraction, to be neglectful of the condition of the fundus. Many influences are at work to bring about such a result.

In the older days, the ophthalmoscope was, practically, the only instrument the ophthalmologist possessed for the objective examination of the refraction, and, although only a slim minority were able to use the instrument with any approach to precision, every oculist did employ it as a daily routine, and with it the eyegrounds were closely scanned. Not only were the macular and papillary regions always examined (incidentally perhaps) in the search for some friendly vessel whose appearance and position might enable the observer to prove the presence, or absence, of astigmatism, but minute changes in the fundus coats and in the media were pretty certain to be detected. In this search, also, even the periphery of the background was usually examined with care. Now, however, the refraction ophthalmoscope is pretty well abandoned, and the skiascope has largely taken its place. Or, to be more definite, objective optometry with the ophthalmoscope has been neglected for the skiascope and ophthalmometer. When one remembers that many serious diseases of the eye, recognizable only with the ophthalmoscope, may exist with perfect central vision, and how difficult it often is to differentiate their symptoms from those of refractive anomalies and accommodative errors, the necessity for the routine use of the ophthalmoscope is all the more apparent.

This tendency to exalt objective optometry at the expense of ophthalmoscopy is seen in the teaching of skiascopy in "Schools of Refraction," and even in post-graduate schools and colleges. The student soon finds that he can "fit cases" even if he never sees the ocular fundi; he also soon decides that the time expended in laboriously peering through the pupil is more "practically" spent in perfecting his knowledge of the shadow test. There is, it is to be feared, some real danger of our training a class of ophthalmologists whose work will be little better than that of opticians, who will regard every patient as a fit subject for glasses, who will think of the eyeground as a kind of reflector for the skiascope rays, and who will, consequently, often fail in their efforts to relieve the ocular distress.

It seems proper, therefore, at this time that every teacher of ophthalmology should insist upon, and every ophthalmologist practice, the good old rule—*before you determine the refraction, examine the fundus.*

C. A. W.

REPORTS OF SOCIETIES.

OPHTHALMOLOGICAL SOCIETY OF GREAT BRITAIN.

October 20, 1898.

Mr. H. R. Swanzy, the President, occupied the chair.

Mr. J. F. Bullar and Mr. C. Devereux Marshall communicated a paper on *Glioma of the Optic Nerve*. The case upon which the paper was based was that of a woman aged thirty-seven who noticed nothing the matter with the eye until 1889 when the left eye became more prominent than natural. This condition increased until 1895 when Mr. Bullar operated and removed the tumor, with the eyeball attached. Immediately behind the eyeball the nerve was of normal size and appearance for a length of 15mm. It then formed a pyriform shaped swelling measuring 15mm. long and 20mm. wide. A cyst-like cavity was formed inside this which was opened during the operation and which was found to contain some straw-colored fluid. On opening it the interior was found to be rough and vascular and had a fatty appearance. The tumor was encapsuled, and the optic nerve was completely lost as soon as it entered the tumor, and it was not again seen at the posterior part as the growth extended at least as far as the optic foramen and probably further still. It would have been impossible to have removed more than was done.

The patient did quite well after the operation and has since married. The tumor was proved by microscopic examination to have originated in the neuroglia; the authors have therefore termed it a glioma of the optic nerve. The eye was normal.

In the literature of the subject 130 cases of tumors of the optic nerve were found, and the results of these showed that these tumors were of slow growth but should be classed as malignant as they were liable to extend into the brain, although metastasis was not found. The question of growths of all sorts met with in the optic nerve was then discussed, and although the different terms applied to them were legion, yet Mr. Marshall was strongly of opinion that the majority of them would fall into one of three groups: (1) Those originating in the neuroglia which

should be termed "gliomata;" (2) those originating in the dural sheath, "sarcomata;" (3) those originating in the pial sheath, "endotheliomata." Statistics had been worked out which proved that the disease was much more likely to occur during the first twenty years of life and a very large proportion occurred before the tenth year.

The result of operative procedures was gone into and although the results obtained by removing the growth without the eye were by no means bad, yet the authors thought that the safest thing to do was to treat them in the manner of malignant growths in other parts of the body and to remove the growth as freely as possible. Mr. Bullar made some remarks on the chief features of the operation, and the whole paper was illustrated by a lantern demonstration, with photographs taken by one of the authors.

The President remarked on the rarity of the disease, he having seen but one case.

Mr. Lawford referred to a case of Mr. Rockliffe's in which it was impossible to remove the entire growth, and in which no evil result had followed.

Mr. Treacher Collins commented on the great variety of names that different authors had given to this group of neoplasms and he thought that the best classification was an anatomical one like that which had been suggested. The optic nerve was a prolongation of the brain substance, and gliomata of the optic nerve far more resembled in structure those of the brain than those of the retina which approached the embryonic type in their cell formation.

Capt. H. Herbert, I.M.S., made a communication on the *tension of the eye in irido-cyclitis*, based on observation of 144 eyes affected with the disease. In the majority of attacks, more especially in the milder ones, the tension was as in simple hyperæmia of the iris and ciliary body, reduced, and this persisting as a rule at least as long as any ciliary injection remained. In other cases a period of high tension of variable duration came on.

The high tension appeared to be due to blockage of the normal outlets from the anterior chamber, and the eyes chiefly affected were, (1) those very severely attacked, with copious exudation, and (2) eyes perhaps lightly attacked but predisposed to glaucoma as shown by shallow anterior chamber in the sound fellow eye and by the more or less advanced age of the patient. In these high tension cases the anterior chamber was deepened and the pupil slightly dilated. In the most intense cases of inflammation the plus tension quickly gave way to soften-

ing; which might be permanent and which indicated atrophy of the ciliary body.

The mild attacks were of the nature of primary subacute glaucoma and were interesting because of difficulties of diagnosis and treatment, there were no grounds for attributing high tension to cyclitis as distinguished from iritis.

He made use of Priestly Smith's tenometer very largely in estimating tension.

Mr. Priestly Smith said that the principles enunciated by Captain Herbert were now generally accepted. There were two processes, mutually antagonistic, concerned in the regulation of tension in irido-cyclitis; one was the suppression of secretion, reducing the tension, the other was the formation of an albuminous exudation hindering filtration and raising the tension. He had been glad to find the tenometer he had introduced had proved serviceable in this investigation. He made some experiments some years ago on tension in which a perfectly limpid albuminous fluid obtained from a serous cavity had been injected into one eye of a cadaver and normal saline solution into the other. In the former it was only with the greatest difficulty that the fluid could be made to drain out of the normal channels, while in the latter the fluid passed without the least difficulty and drained away, thus showing that albuminous fluids will not pass through animal membranes without great pressure.

The following card specimens were shown: Mr. R. M. Gunn: Case of Retinal Diseases; Mr. R. D. Batten: Superficial Central Choroiditis.

CHICAGO OPHTHALMOLOGICAL AND OTOLOGICAL SOCIETY.

November 8, 1898.

The president, Dr. W. F. Coleman, in the chair.

The question of the society becoming affiliated with the Chicago Medical Society was brought up and discussed, and on motion of Doctor Ware the society voted in the affirmative.

Dr. Clark W. Hawley presented a case of *Traumatic Cataract with Dislocation of the Lens* with the following history: A year ago this summer this man belonged to the State militia, and while attending to his duty in the artillery, stood at the side of the gun when the firing was going on in practice. Nothing occurred for nearly a year. He still

belonged to the State militia, but when it was sent out to join the regular army he had to pass his examination the same as the other soldiers. This was some time in May. He had an examination for entrance to the army and both eyes at that time were apparently normal, so far as the examination showed. After going South with the army he noticed a defect in the left eye. The surgeon who examined him, told him he had a cataract forming. After a time he sent him North to have something done for it, and his discharge papers were made out. On examination Doctor Hawley found a soft cataract, and that is about all that is known of the case. He tried hard to find some history of injury, but the patient does not know of a blow or injury of any kind happening to the eye. He has never had disease of any kind that he knows of. Two weeks ago to-morrow a needling was performed, atropin being instilled into the eye beforehand, and the needle was carried through the cornea and the anterior capsule punctured, running the needle well into the lens and withdrawing it, not making any attempt to cut the capsule or stir up the lens. On examining the eye afterward nothing abnormal was seen. A small bead of lens showed itself where it had been punctured. The next morning, when the bandages were removed, a singular accident was shown, which occurred some time between the time of the needling and that morning. The lens had become dislocated, simply turning upon its vertical axis, from the nasal portion of the eye toward the outer, so that it stood, when first seen, very nearly vertical, slightly slanting toward the inner aspect of the eye. The anterior surface of the lens looking toward the temporal side. The edge was very closely defined. The lens was enormously swollen, so much so that the anterior edge touched the cornea. The iris was fully dilated by the atropin, and the upper and lower portions could just barely be seen above and below the lens. After discussing the matter with Doctor Starkey, it was decided that the best thing to do was to let it alone and not attempt to remove the lens, because it would be difficult indeed to make an incision for the extraction owing to the position of the lens, which was so swollen that if any attempt had been made to do an extraction even in a diagonal direction, it would have been necessary to pass through the lens. The eye has been watched from day to day; there has been no increase of tension up to yesterday morning, at which time the condition was as follows: The lens, or most of it, was posterior to the pupil; one small portion at the lower part was hanging over the border of the pupil into the anterior chamber. There seemed to be a little finger-like projection at the lower portion of the lens where it had been caught in the capsule. In watching the lens from day to day

we could see the changes going on, it becoming more opaque and smaller. In the beginning it was sufficiently opaque, so that the patient could barely make out figures as you pass them before the light. There has been very little irritation, no pain, no iritis, no increase of tension up to the present time. Absorption is going on rapidly.

There was a peculiar condition on the anterior surface of the lens that could not be accounted for. On the inner surface near the edge of the iris there are a number of little dots which appear to be red in color. There were no adhesions apparently, at the time of first examination, the pupil was normal in shape and but slightly dilated. Reaction to light good and light perception and projection very good.

SECTION ON OPHTHALMOLOGY.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Meeting November 15, 1898. Dr. George C. Harlan, Chairman, in the chair.

Rupture of the Iris and Choroid.—Dr. B. A. Randall reported the case of a boy struck in the eye by a stone three days before, in which there was partial paresis of the iris above and a pupillary nick below, and in the choroid near the disc three nearly parallel linear lesions. These streaks were not real ruptures of the coat but torsion injuries comparable to those reported by him in 1887. There was neither extravasation nor uncovering of the sclera in the affected areas, but merely yellow streaks that will doubtless undergo atrophy and pigment degeneration and present the appearance of total rupture. The macula was uninjured and V. nearly normal. Each lens showed a tiny extranuclear opacity, more pronounced on the uninjured side. They were probably congenital, but might readily be ascribed to the injury, hence from a medico-legal point of view assume considerable importance. (The patient has since been seen, twenty-six days after injury, and already shows nearly the typical appearances of choroidal rupture with degeneration of the margins.)

Dr. R. R. Tybout read, by invitation, a *Report on the Value of Pilocarpin in the Treatment of Diseases of the Interior of the Eye.* The speaker detailed a case of violent iridocyclitis in a man 31 years of age who had general ciliary injection, contracted pupils, extensive posterior synechiæ, and deposits on the posterior surface of the cornea. T. + 1.

V. R. 6/60, L. 6/24. The patient had been infected with syphilis eighteen months before and had been treated with mercury and iodids. Vision still further declined under a continuance of these remedies. After twenty-one hypodermic injections of gr. ⅛ of pilocarpin muriate, extending over seven weeks, and gr. 60 potassium iodid daily without mercury, improvement was rapid and pronounced. V. increased to R. 6/24, L. 6/15. There were no relapses, tension became normal, and the exudation was promptly absorbed. Six months later V. had increased to R. 6/9, L. 6/6.

Also two cases of episcleritis, both having received pilocarpin *locally* and one internally. In the first case, a woman, aged 31, the inflammation had persisted for four weeks, and recovery ensued under pilocarpin sweats in two weeks. She had no relapses during the following month that she continued under observation. In the second case, a woman, aged 27, the pain and signs of inflammation which had continued for eight weeks yielded to salol internally aud pilocarpin locally much less promptly.

Toxic Chromatopsia and Toxic Hysteria.—Dr. de Schweinitz related the history of a patient, aged 51, who asserted that his left eye had always been defective in vision and had practically been blind for eleven years, and whose right eye for eight weeks previous to examination had been affected with marked xanthopsia in the form of clouds of orange-colored smoke which passed constantly before it. With the exception of catarrh of the stomach, the patient presented no constitutional ailments, but had always been an excessive smoker and for part of his life a chewer of tobacco. He did not use spirits in any form. There was a typical relative central scotoma in the right eye, and in the left, or supposed blind eye, a scotoma could also be demonstrated in the center of the light field, which in its periphery was normal, just as the form-field in its periphery was normal on the other side. Under a regimen which consisted in abstinence from tobacco, full doses of iodide of potassium and strychnia, the patient improved, and in six weeks returned with the vision of the right eye normal, the chromatopsia gone, and the scotoma no longer demonstrable, or at least only a slight depreciation of color-sense in the old scotomatous area. Tests for feigned monocular blindness were now perfectly successful, and by all ordinary methods it was positively shown that the patient read as well with his left as with his right eye. There had never been any ophthalmoscopic changes of gross disease, probably only a slight flushing of the optic disks. There was also partial hemianesthesia of the face. The speaker compared the case

to various forms of toxic hysteria as they are seen under the influence of lead, alcohol, mercury, bisulphide of carbon, and nitro-benzol. So far as his experience went, xanthopsia as a symptom of the toxic action of tobacco had been observed only once before.

Dr. William Campbell Posey contributed *A Clinical Study of 287 Cases of Hyperphoria.* The author endeavors to measure the deviation which the eye undergoes when it is screened off in the ordinary refraction test, whilst the other eye fixes the test-card sharply in the endeavor to obtain the best visual acuity. To accomplish this, the vision of the right eye is first obtained, the left eye being obscured by an opaque metallic disc. This done, the right eye is obscured by the disc and the left eye made to regard the chart. So soon as the vision of this eye has been obtained, instead of removing the shield from before the right eye and permitting the patient to bring the eyes into a state of parallelism by the unconscious desire for fusion consequent upon binocular vision, the patient is told to regard a bright electric light placed on a level with the line of test letters which he had just read and but a few inches from it, the right eye still being covered. The Maddox rod is then lowered before the left eye, the patient's attention called to the streak, the disc quickly removed from before the right eye and the patient requested to give the relative positions of the light and the streak; and deviations, lateral or vertical, are at once measured by means of the rotary prisms which are in position before the eyes.

As a result of his observations, which extended over 2,300 private cases of refraction, he deduced the following conclusions:

(1) Hyperphoria of 1° or more exists in about 13 per cent. of all cases of refraction, and, as regards its frequency, is independent of associated exophoria, esophoria, or lateral orthophoria. Hyperphoria occurred most frequently to the extent of 2°. (2) In general the degree of hyperphoria seems to bear a close relationship to the degree of esophoria and exophoria in any case, increasing or diminishing in proportion as the lateral muscular deviation increases or diminishes, but a high degree of esophoria or exophoria does not necessarily imply the presence of hyperphoria. (3) In like manner, high degrees of ametropia need not be accompanied by hyperphoria, for the author found an equal number of cases of both M. and H. of high degree in which hyperphoria was absent. In these latter cases, however, it was noted that there was but a slight deviation in the lateral muscles, while on the other hand it was found that high degrees of ametropia associated with high degrees of lateral heterophoria were almost always attended with hyperphoria. (4) In anisometropia, on the

other hand, hyperphoria is present in all cases where the difference in refraction between the eyes is at all marked, even when associated with a moderate degree of esophoria or exophoria. When there is lateral orthophoria, or but little difference in refraction between the eyes, hyperphoria is rarely present. (5) Strabismus, both convergent and divergent, is invariably accompanied by hyperphoria, of which at least one-fourth of its total amount is latent. (6) Latent hyperphoria is common and occurs independently of the state of the lateral muscles, although it is more frequent in exophoria (2 per cent.) than esophoria ($1\frac{67}{100}$ per cent.) or in lateral orthophoria ($1\frac{1}{8}$ per cent.). (7) Unlike latent H., latent hyperphoria develops quite independently of age. (8) The correction of errors of refraction is not sufficient in the majority of cases to bring about a disappearance of any existing hyperphoria, as the author has found that hyperphoria becomes more manifest the longer glasses are worn, whether vertical prisims have been incorporated into the formula or not. (9) Supraorbital headache is the most frequent symptom. In a small proportion of cases it will be unilateral, usually on the same side as the eye with the lower vision. Typical attacks of migraine may be expected in about 5 per cent. of all cases of hyperphoria. A symptom of frequent occurrence and of great value in directing the attention to the existence of hyperphoria consists in an associated reflex in the supply of the facial nerve. This may manifest itself either in a unilateral twitching of the lids as in nictitation, or more rarely by pronounced blepharospasm.

HOWARD F. HANSELL.
Clerk of Section.

HAAB reports the results of treatment in sixty-five private patients suffering from acute inflammatory and chronic glaucoma. He claims to have permanently cured about 62 per cent. of his cases, that is, he dissipated the tension. Eight cases recurred, but were relieved by myotics. In 91 per cent. vision was preserved as good as before the iridectomy, and in some cases it was even improved. He claims to have cured 20 per cent. of his cases of hemorrhagic glaucoma, which is a pretty large per cent., considering the experience of others. 40 per cent. of his cases of hemorrhagic glaucoma retained vision. In the latter variety of cases he prefers sclerotomy to iridectomy, as the severity of the intervention is less.

CORRESPONDENCE.

"EMMETROPIA, OR CORRECTED AMETROPIA.

To the Editor of the Ophthalmic Record:

Sir:—In the issue of the Ophthalmic Record of October, in the article "Emmetropia, or Corrected Ametropia," the following occurs: "When not complicated by pathological conditions, ametropia, in persons under fifty-five years of age, should not be considered as perfectly corrected if the distant vision, in the absence of accommodative effort, be less than six-sixths (six-sixths to six-ninths after the sixty-fifth year) with near vision lenses." This should be: "When not complicated by pathological conditions, ametropia, in persons under fifty-five years of age, should not be considered as perfectly corrected if the distant vision, in the absence of accommodative effort, be less than six-sixths with near vision lenses."

Norburn B. Jenkins, M.D.

Knoxville, Tenn.

"THE EDUCATION OF THE OPHTHALMOLOGIST" AGAIN.

To the Editor:—In the November issue of the Ophthalmic Record a correspondent, S. E. Cook, criticises a recent editorial by the writer as "pernicious teaching," "the legitimate result of which would be the rapid multiplication of ophthalmic colleges, refraction colleges, etc."

A careful reading, however, of that editorial convinces me that only hasty judgment and careless consideration of its statements could lead to such conclusions, and that the critic has wholly misunderstood its intention.

At the outset it was stated therein that "well balanced medical men disparage the tendency to specialism; they see in it a drift toward narrowness, superficiality and ignorant exaggeration, and insist, *with reason*, that the best preparation for following a specialty is a thorough education, supplemented by ten years or more of general practice." Again: "*It*

needs no argument to demonstrate the value of such preparation for the recognition and successful treatment of maladies of the eye, so many of which are the result of systemic disease."

In spite of these plain statements my critic *does* deem an argument necessary, and setting up a straw man, proceeds to demolish it, seeking, among other things, to convict me of teaching that affections of the lens and retina bear no relation to physiologic laws.

A fountain cannot give forth at once sweet and bitter water, and the above quoted portions of the editorial should have suggested that those statements to which exception is taken only apparently conflict with them.

The critic vehemently combats the assertion that "ophthalmology is peculiar to itself in respect to the *study* (education is the subject of the editorial) of ocular physiology (in the sense of the focal and axial adjustment of the eye) and dioptrics, light and color perception, binocular vision, ophthalmoscopy, skiascopy, keratometry, perimetry, etc., and no amount of experience in other departments of medicine is of the slightest assistance in understanding them." Yet this is literally true. The context plainly indicates that the terms *ophthalmoscopy* and *skiascopy*, for instance, are used in the sense of *technical procedures*, and as parts of the theoretical training of the ophthalmologist. In Gould's Dictionary, under the head of "Ophthalmoscopy," *medical ophthalmoscopy* is defined as "Ophthalmoscopy as an aid to internal medicine," etc. It would be quite another thing to assert that *clinically* these procedures are unrelated and independent of the various departments of medicine.

The writer has taught ophthalmology for fifteen years, didactically and clinically, and his experience has taught him, contrary to the critic's contention, that the principles of theoretical ophthalmology, especially as found in the works of Donders and Landolt, are acquired with comparative difficulty after the age of thirty-five.

Lastly, the critic takes exception to the statement that "With a ground-work of physiology, chemistry, physics and mathematics, those branches of ophthalmology peculiar to itself can be mastered in a university preliminary medical course, and the time spent in a medical college actually shortened." Here the writer pleads guilty to having omitted to qualify a decidedly sweeping statement; he should have written instead, *the ground principles of those branches.* He had in mind the course of study provided in the undergraduate department of several of our universities, notably at Cornell, Johns Hopkins and Leland Stanford, in all of which it is known as the "medical preparatory course,"

and in the register of Stanford referred to as "A course which gives that foundation both in scientific knowledge and in skill in experimental physiology, and in histological and anatomical technique, which makes it possible to accomplish the medical course of the best medical schools in a shorter time and with much better advantage."

F. B. Eaton.

706 Sutter St., San Francisco, Cal.

At the last meeting of the *New York State Medical Society*, Dr. J. H. Woodward of New York City, read a very sensible paper on the "Course and Management of Cataract." The tone of the paper must commend itself to all thoughtful, conservative and experienced practitioners and should be a warning to those who believe in instantly calling all lenticular opacities cataracts and then proceed to distress the patient and his friends by premature operative suggestions. Dr. Woodward calls attention especially to the fact that many cases of senile cataract show but little if any progressive loss of vision, and that improvement even is often observed and that complete cataractous degeneration of the senile type was a process often requiring many years for its consummation. Dr. Woodward emphasizes the fact that as a failure in the nutrition of the crystalline lens is probably the cause of cataract, the nutrition of this part should be maintained to the highest possible point. Errors of refraction should be corrected, and every effort made to improve the general health and avoid eye strain. He believes that these patients should be allowed to read by a good light until they felt that the eyes were tired, but that they must then promptly discontinue using the eyes until again thoroughly rested.

Amongst fifty-four cases of tabetic atrophy of the optic nerve, Silex found forty-four of them of syphilitic origin. Twelve had undergone thorough specific treatment, eight had been treated for years. He believes that even thorough treatment will not always relieve these cases. He found the treatment ineffectual. Electricity, iodide of potassium, strychnine, silver, etc., were administered in all possible ways. He concludes that the only possible means to retard the development of the affection is with strengthening therapeutics to tone up the organism, especially the nervous system.

NEWS ITEMS.

Personals and items of interest should be sent to Dr. Frank Allport, 92 State St., Chicago.

Dr. de Beck of Cincinnati, Ohio, has been made a member of the Sociéte Française d'Ophtalmologie.

Dr. Geo. H. Stubbes of Birmingham, Ala., has been appointed Eye and Ear Surgeon to the Southern Railway, west of Atlanta.

By the will of the late Mrs. Annie S. Paton of New York City, the Manhattan Eye and Ear Hospital will receive $50,000.

Dr. Casey A. Wood has been appointed Professor of Clinical Ophthalmology at the Chicago College of Physicians and Surgeons (Medical Department, University of Illinois), Chicago.

Dr. John P. Davidson of Richmond, Va., has been elected Professor of Diseases of the Eye, Ear and Throat, in the Medical College of Virginia.

The medical staff of the Home for Friendless Women of Louisville, Ky., has just been organized. Dr. S. G. Dabney has charge of the Eye, Ear and Throat department.

Dr. Boyd of Leadville records over one hundred cases of inequality of the size of the pupils in that city, which is 10,000 feet above the sea level. He attributes it to the altitude, but cannot say "why."

At a meeting of the Philadelphia Ophthalmological Society held November 10th, Dr. George E. de Schweinitz presented some very interesting mounted specimens of sarcoma of the choroid and sectional drawings together with micro-photographs of stained specimens of metastatic carcinoma of the choroid. Dr. de Schweinitz believes his specimens to be the twenty-seventh on record. Glioma of the retina was also discussed.

PRELIMINARY PROGRAM of the Fourth annual meeting of the Western Ophthalmologic and Otolaryngologic Association, New Orleans, February 10th and 11th, 1899.

Dr. George T. Stevens of New York, will give the address before the Section on Ophthalmology.

J. Ellis Jennings, St. Louis, -	Title later.
D. Milton Greene, Grand Rapids, Mich.,	Fifty mastoid operations, including four brain abscesses and one perforation of the sigmoid sinus.
W. L. Ballenger, Chicago, - -	Title later.
N. H. Pierce, Chicago, - -	Indications for operative interference in chronic suppurative otitis.
H. H. Brown, Chicago, - -	The etiology and importance of iritis.
Hal Foster, Kansas City, - -	Congenital nasal atresia.
Cassius D. Wescott, Chicago, - -	Some experiences with Dr. Gould's method of prismatic exercises.
H. V. Würdemann, Milwaukee, -	A report on operative treatment of high myopia.
George F. Keiper, Lafayette, Ind., -	Treatment of diseases of the lacrymal duct by catophoresis with exhibition of cupped sounds.
W. H. Baker, Lynchburg, Va., -	Retinoscopy.
A. Alt, St. Louis, - - -	The pathology of cataract.
E. E. Hamilton, Wichita, Kansas,	Refraction of trachomatous eyes.
S. S. Ledbetter, Birmingham, Ala., -	Keratitis herpetica.
J. J. Kyle, Marion, Ind., - -	An ophthalmogist's experience with the army.
E. C. Ellett, Memphis, Tenn., -	Series of cases of malarial keratitis, with reports of blood examinations.
J. R. Robinson, Colorado Springs,	Title later.
G. A. Wall, Albuquerque, N. M., -	Retinal detatchment, loss of vision, recovery.
Casey Wood, Chicago, - -	Glioma of the medulla, with report of autopsy and microscopical examinations.
W. A. Fisher, Chicago, - -	Title later.
James M. Ball, St. Louis, - -	Large tumor of the brain encroaching on the motor area and causing few symptoms save optic neuritis, with remarks on the value of double neuritis as a sign of brain tumor.
L. R. Culbertson, Zanesville, Ohio, -	Case of Bell's palsy and epilepsy cured by correction of ametropia and heterophoria.
Ellet O. Sisson, Keokuk, Iowa, -	Injuries of the eyeball, with report of cases.
W. T. Groves, Eureka, Kansas, -	Tuberculosis of tonsils, pharynx and larynx.
W. E. Driver, Norfolk, Va., -	Best vision after cataract extraction.

The fourth volume of the "Norris & Oliver's System of Diseases of the Eye," will appear about the first of the year. Everything has been brought directly up to date. No ophthalmologist can afford to be without this magnificent work.

The first Fall meeting of Washington ophthalmologists and otologists was held October 21st, and was presided over by its president, Dr. Swan M. Burnett. Dr. Newal read a paper on "Esophoria and Ciliary Spasm." Dr. Belt read a paper on "Inflammation of the Middle Ear."

The Columbian University Hospital was formally opened for the reception of patients November 1st, 1898. The building is located within one hundred feet of the medical department and will accommodate thirty patients. It is a Baptist institution. The ophthalmologists on the staff are Drs. D. K. Shute, W. K. Butler and F. K. Newell.

Under something of a reorganization of the Faculty of the N. Y. Post Graduate School, the Eye Department is under the charge of the following gentlemen: *Professors:* D. B. St. John Roosa, W. O. Moore, J. B. Emerson, F. Valk, E. S. Peck; *Adjunct Professors:* F. Van Fleet, A. E. Davis; *Instructors:* A. E. Adams, A. B. Deynard, D. Weisner, W. M. Carhart, W. W. Gilfillan, C. W. Kinnes, E. S. Thomson, C. A. C. Jones, G. B. McAuliffe, G. H. Cox, J. R. Nelson.

A New York oculist is reported in a scientific journal as saying, "that Americans are too reckless of their eyes in exposing them to the electric light rays, and if a reform is not had, a sightless race may be developed." "The proper thing to do," he adds, "is to abolish electric lamps altogether and substitute fluorescent tubes, which cost no more and give a steady light." It is said that arrangements are being made to light an entire block in New York by fluorescent tubes.

The friends of Dr. W. H. Wilder of Chicago, have been pained to learn of the serious accident which nearly cost him his life. It seems Dr. Wilder endeavored to get on a grip car while it was in swift motion. He was dragged under and between two cars and carried in this manner for nearly a block, before the cars stopped and he was relieved from his precarious position. He was seriously injured and taken to the Passavant Hospital, but we understand is now improving. The Record extends to him its sympathy and best wishes for a speedy recovery.

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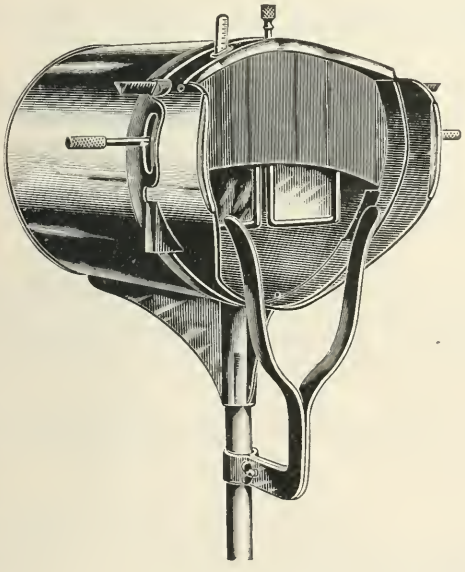

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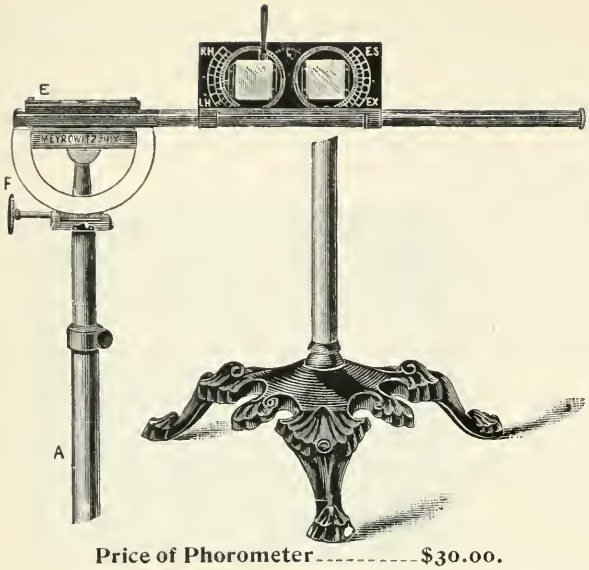

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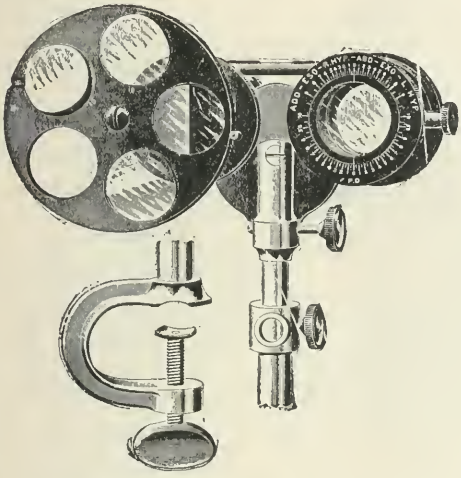

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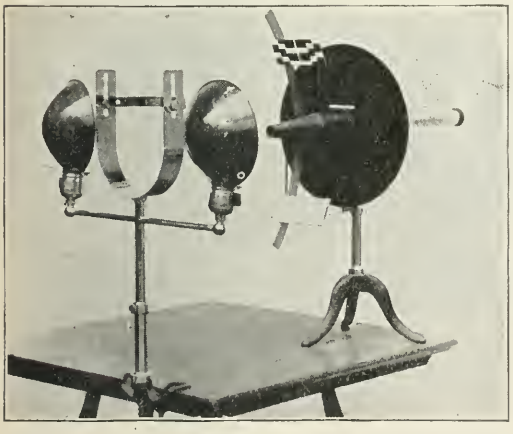

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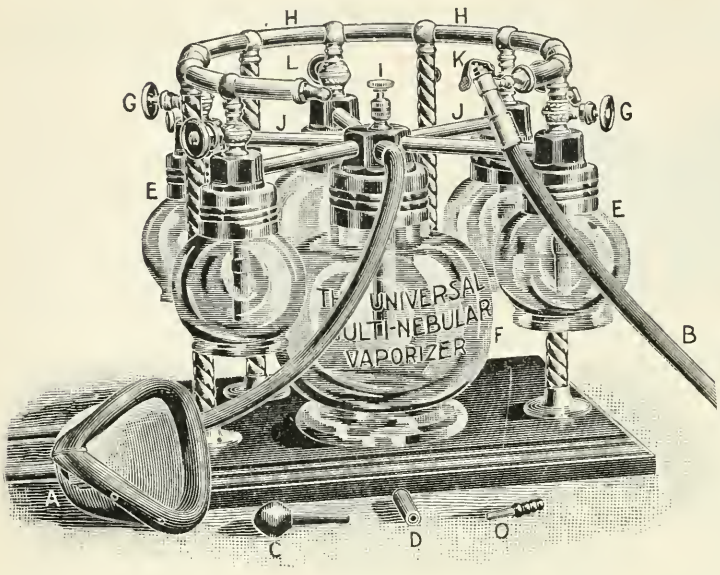

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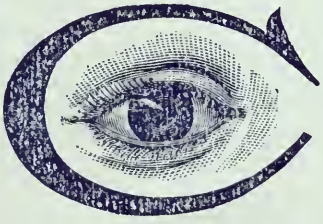
TRADE  MARK

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